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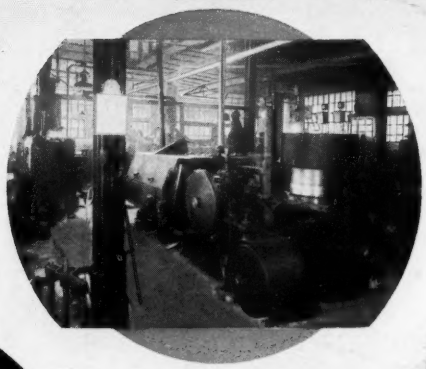

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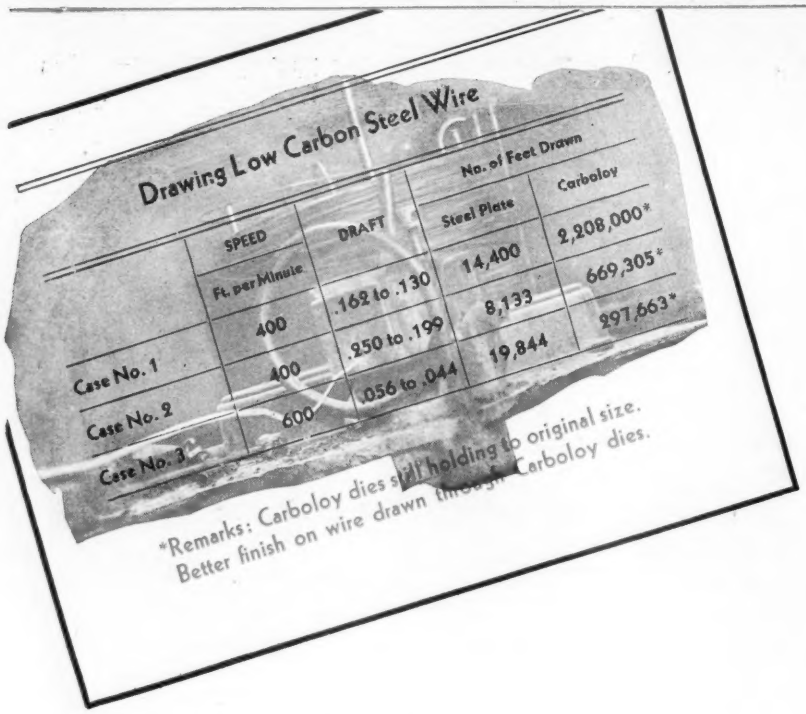

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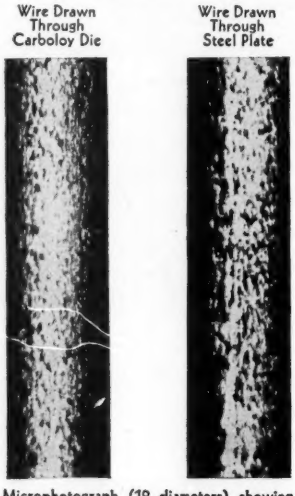

Microphotograph (12 diameters) showing better finish on wire drawn through Carboloy Die at large New Jersey mill. See page 10, Vol. II., No. 2, CARBOLOY.

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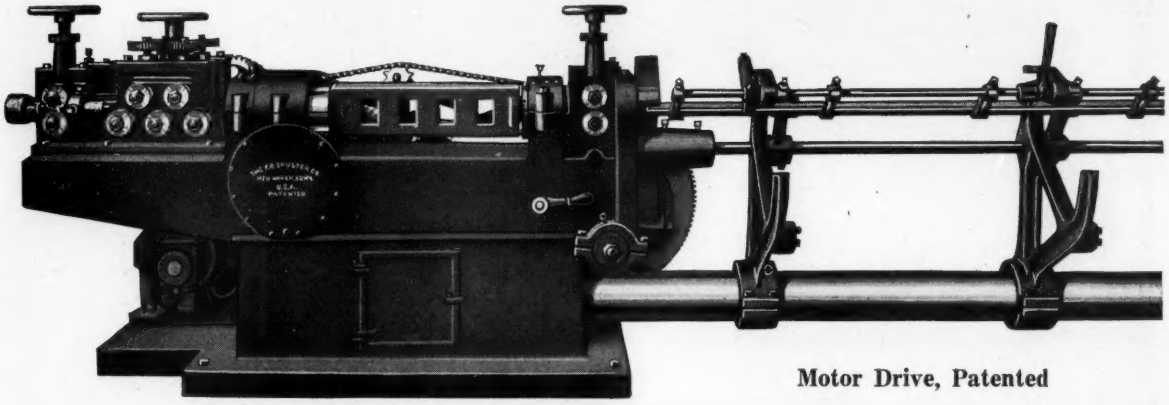

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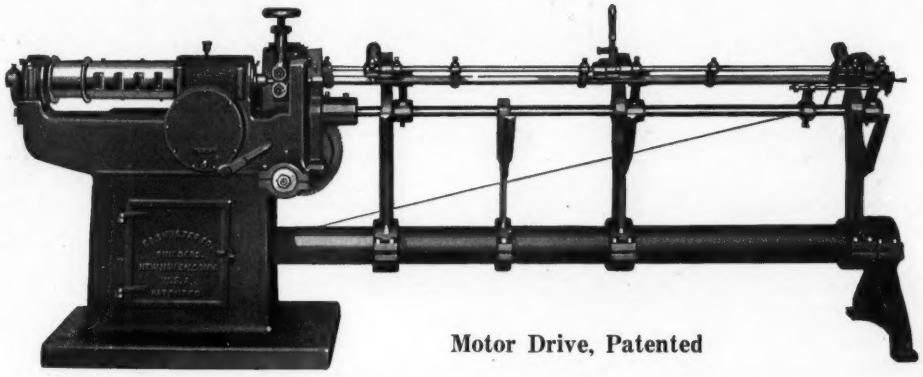

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Lubricants
Non-ferrous common wire products
Non-ferrous specialties
Non-ferrous wire
Pickling
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NEW YORK

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 5 August 1930 No. 8

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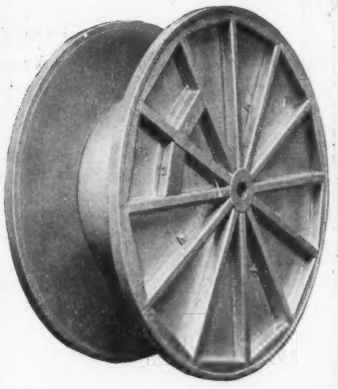

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WIRE
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Devoted to the Production and Fabrication of Wire

Vol. 5 AUGUST, 1930 No. 8

Wire and the Signal Corps

Unusual Service Required of Wire and Influence of This on Production---Army's Requirements

Captains A. M. Shearer and George P. Bush

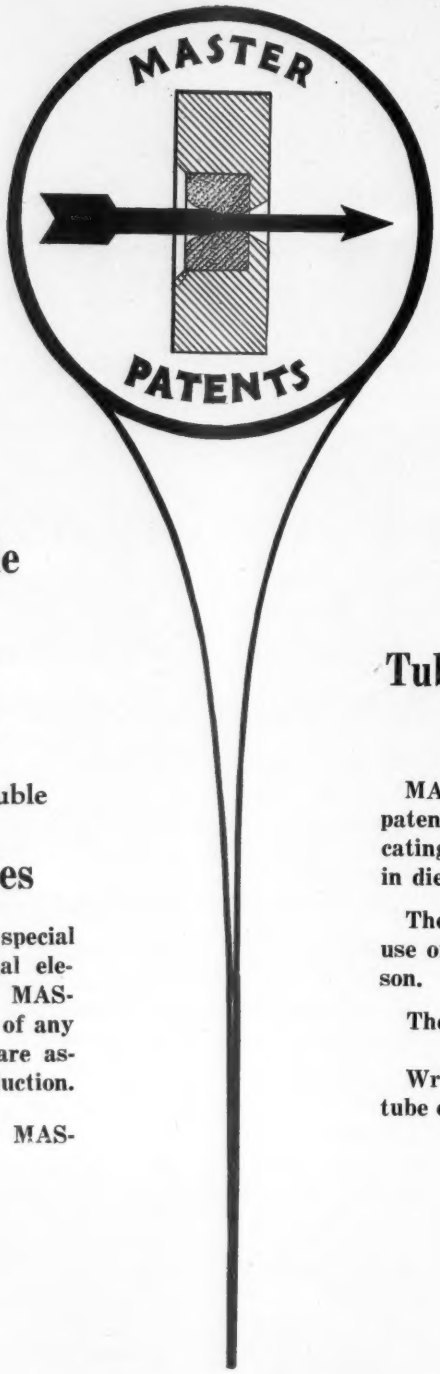
WIRE, cable and radio channels are the nerves through which the national life of the United States is made possible in time of peace and through which the Army and the Navy must be controlled and coordinated in the event of an emergency threatening the existence of the United States as at present constituted. As civilization becomes more complex and dependent upon rapid and accurate communication, so does the Army become more and more expectant of, and dependent upon, quick and certain communications. Radio has made almost unbelievable strides in the past ten years, but wire will still carry the bulk of Army communication in any theater of operations, due to the necessity for secrecy. Accordingly it is communication wire with which this article deals.

Published by special permission of United States Army Signal Corps.

Wire Service in Two Different Branches

Military wire communication is divided into two zones; that serving the mobile and tactical troops such as the regiment, division, corps and army; and that serving the supporting agencies which, in France, were termed the "S. O. S." This latter, or communication zone, makes use of the same methods and equipment as are used in commercial practice, but the former, or combat zone, must use adaptations necessitated by greater mobility and the hazards involved. It is this combat zone that causes the procurement problem, as we find the bulk of the traffic carried over non-commercial "field" and "outpost" wires. These wires, in general, must have unusual strength, flexibility, and insulation as well as the capability of being laid, without injury, from vehicles moving as fast as fifteen miles per hour. The photographs included in this article were made by the Signal Corps and are actual scenes either

Fig. 1. A Signal Corps Field Operating Station.



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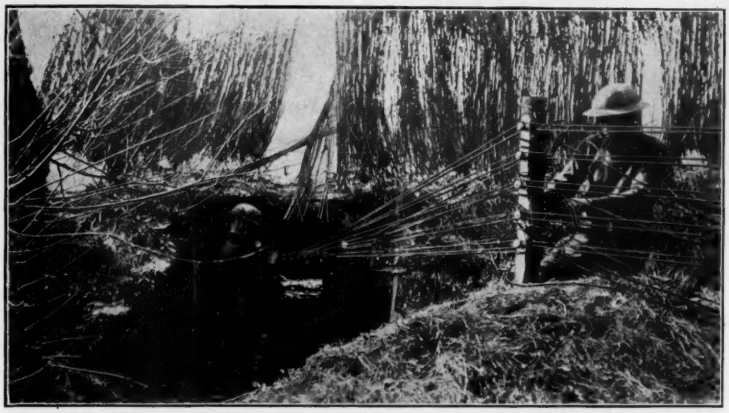


Fig. 2. Signal Corps Installing Telephone Lines to Front Line—Montigny, France—March 12, 1918.

during the World War or training maneuvers. They give a general idea of how the wires are made.

Going more into the detail, the following characteristics are among many that are to be desired in such wire.

It must lie inert on the ground so as not to become tangled by marching men, horses, or vehicles.

The wire should not kink, but should be pliable enough to permit a square knot splice that will not become brittle and rupture.

Two pairs of wire laid parallel must not cause crosstalk.

The transmission qualities should be retained after lying in the mud and even submerged in pools of water for a month, and there should be no appreciable leakage of current to the ground.

The concussion of high explosive shells and aerial bombs should not cause breaks except where the hits are exceptionally close.

The wire should be of the lightest possible weight.

After 24 months dry storage, the insulation must not have deteriorated or cracked so as to defeat any of the above requirements.

And finally, the paired "field" wire should give satisfactory telephonic communication over a distance of twelve miles (24 miles of metallic circuit) and the "outpost" wire over a distance of 7 miles.

For 7 years Captains Shearer and Bush have been engaged on Signal Corps Procurement Planning in connection with the industrial capacity of the United States in the event of a national emergency. The motive can be summarized as "Obtaining assurance that the required munitions can be obtained in the event of an emergency threatening the life of the nation". Many readers of WIRE AND WIRE PRODUCTS have been visited in connection with the productive capacity of their plants. In view of the above, WIRE AND WIRE PRODUCTS has obtained this article presenting the general problem with which the wire industry would be confronted in the event of such an emergency.—The Editor.

Where, in commercial life, are we to find such a wire in amounts to meet our requirements? During the World War the United States used great quantities of commercial substitutes and foreign made wire because of the time necessary for American manufacturers to get into mass production. It is doubtful if any readers of WIRE AND WIRE PRODUCTS are engaged in making any wire that will meet these unusual requirements unless it is being made for the Signal Corps. Even if they were, the amounts would be a mere fraction of that required in an emergency. From all available information it is possible that the wire problem might well develop to the magnitude shown in the following tabulation.

Approximate Signal Corps Requirements—6 Month Period

Twisted Pair	
Field Wire, Type W-40	180,000 miles
Outpost Wire, Type W-44	75,000 miles
Total	255,000 miles
Steel Wire (Components of the above wires)	
320,000 lbs. per sq. in.—.012″	3,700 Tons
155,000 lbs. per sq. in.—.013″	510 Tons
Bronze Wire (Component of the outpost wire above)	
90,000 lbs. per sq. in.—.013″	776 tons
Stranding and Braiding	2,692,800,000 Feet

If the information that has been collected by the Signal Corps is accurate, and we believe that it is, as it is based to a great extent upon information that has been furnished by wire manufacturers, there are certain inescapable conclusions to be drawn:

First: If all the known 11 and 7 wire stranders were to be

(*Please turn to page 332*)

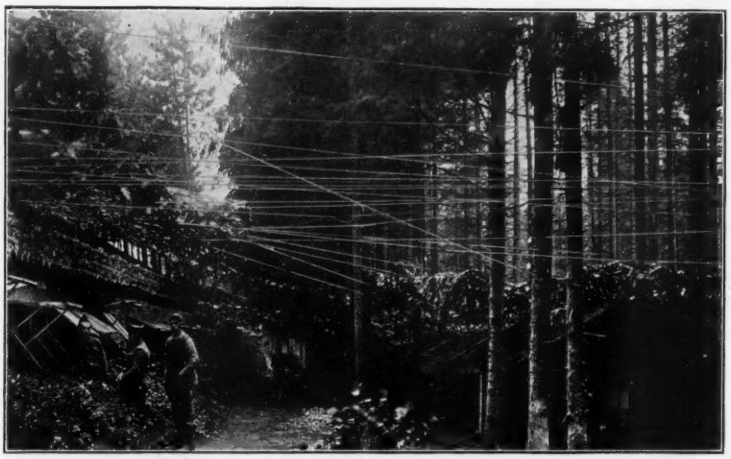


Fig. 3. Camouflaged Headquarters 26th Division Sommedieue, France—August 31, 1918.

The World's Wire Drawing Practice

Methods Being Used Outside of the United States, including Canada, Mexico, Great Britain, Sweden, Etc.

*By Kenneth B. Lewis**

(*Continued from page 288, July*)

Europe in General

For the purposes of this discussion, all Europe can be considered as a unit as the wire drawing practice characteristic of Europe is practically universal. I have visited Germany, Belgium, France, Italy, Holland, and Luxemburg, and have discussed wire drawing practice with manufacturers from Spain, Czecho-Slovakia and Austria and find no essential differences. The peculiar characteristic of European wire drawing practice is wet drawing. In many mills there is absolutely no lime, no soap and no baker, in fact up to 2 or 3 years years ago, I believe there were not half a dozen bakers in the whole of Europe. In typical European practice the rods are pickled in sulphuric acid, washed in hot water and trucked direct to the wire drawer where they are coppered by hand and drawn wet all the way to finished size. In the earlier drifts the rods are coppered after each draft and dipped into a lubricating solution, after which they are thrown onto a dry reel and drawn. In the intermediate sizes the copper coat will last for two or three drafts and eventually as the wire gets down into small sizes it will go six, seven or eight drafts with one coppering. Somewhere between 14 and 16 gauge the bundle generally goes onto a reel in a tub of liquor. When I say that the wire is coppered, I mean exactly that. There is absolutely no tin in the solution but the wire shows the same grading of colors which we generally get with a combination of tin and copper sulphate.

There are many natural consequences of wet drawing. The drafts are considerably lighter than in American practice, the ratio being about 7 to 9. Bundles are always smaller, ranging from 40 to perhaps 100 lbs. Drawing speed is very low. As a natural consequence of small bundles, the output per man is very low indeed. This low output per man on account of small bundles naturally carries over into the various fabricating departments.

The following schedule of output per man-hour is typical.

From	To	Drafts	Blocks per man	Lbs. per man-hour
Rod	10	2	2	600
10	11	1	2	900
10	11½	1	2	800
10	12½	2	3	700
10	13	2	3	600
10	14	3	4	350
10	16	3	4	300
10	16	4	4	200

Consolidating this practice for comparison with American practice, we get the following figures.

Size	Lbs. per Man-hour Europe	U. S. Single Hole	U. S. Continuous
Rod—4 hole 12½	325	800	1,500
Rod—4 hole 13	300	700	1,200
Rod—5 hole 14	238	500	1,000
Rod—5 hole 15	225	400	900
Rod—6 hole 16	200	300	700

Wire drawing itself is subdivided differently than with us and some calculation is necessary to get figures which can be compared with American practice. Wet wire drawing can be sub-divided with no loss in efficiency or division of responsibility, because the coating is always renewable. One man generally draws two drafts to 10 gauge and passes the wire on to another who carries it to about 14 and passes it on. The dies are very large steel plates of the "pepper-shaker" variety some of which have as many as 200 to 300 holes. These plates are wedged firmly into the plate stands and and after a draft the wire drawer picks up his hammer, leans over the plate stand and hammers up the hole in place. He then drives the punch into it and starts another bundle. This seems rather crude but in the circumstances it is effective. When wire is going down a good many drafts it nearly always scratches badly in the first draft, but nobody cares. It gets another dip into the copper and the second draft scratches somewhat less. In the third draft it begins to round up fairly well. The fourth draft is generally good and from there on it gets better and better. There is practically no scrap. No wire is ever so badly scratched that another dip wont save it. When reasonable care is used this wet drawn wire galvanizes and tins satisfactorily.

One interesting feature of this practice is that except where it is necessary to meet specifications, there is no process annealing in the common products. Rods are regularly drawn to 20 and 21, 22 and in some cases 24 gauge hard. This tends to confirm a theory which I have long held that when basic stock begins to break up apparently as a result of overdrawing, it is really suffering from nothing but a loss of coating. The coating has become so thin and the friction in the die so great that the wire breaks up. Process annealing is necessary not so much to restore the structure as to prepare the surface to receive a new lubricating coat. Of course

*Morgan Construction Co., Worcester, Mass. Paper read before Wire Division, Assn. Iron & Steel Elec. Eng.'s Exposition & Convention, Buffalo, N. Y., June 18.

it is true that this wet drawn wire that goes so far from the rod has been drawn rather light drafts and the records seem to show clearly that its tensile strength has not increased so rapidly as in the case of dry drawn wire. The fact remains however that several of these European mills have gone onto dry drawing practice and high speed continuous machines and by careful preparation of the rod are practically duplicating these results in dry drawn wire heavily drafted.

The process described above as typical European practice is frequently modified, particularly in Belgium and Germany. In many mills it is customary to draw the first two drafts to 10 gauge with a lime coating and a soap powder lubricant. The coating doesn't amount to much and at 10 gauge the wire can be dipped at once into the copper solution and carried on wet. In some mills a certain proportion of the wire is drawn dry to finished sizes ranging down to 14 and even in extreme cases to 15 and 16 gauge. This I believe is chiefly for export nails. The practice is quite special, just as much so as production of the same sizes by wet drawing would be special in an American mill. This dry drawn nail wire is drawn without baking. The bundles are small, the drafts light, the speed slow and the product generally no better than nail wire should be.

I gather from conversation with importers in the Latin-American countries that the American nail wire is preferred to the European on account of greater stiffness, which often makes it feasible to reduce the gauge with relation to the length of the nail, with a consequent saving in cost per nail.

The American wire is stiffer for two reasons: first, it is generally drawn from a much larger rod—actually 4 or 4½ gauge as against No. 6 in Europe, and second, the heavy drafts made possible by dry drawing result in more stiffening effect than light drafts to the same total reduction of area. European mills exporting nail wire are meeting our competition by a modified dry drawing practise. They are also beginning to draw nail wire from heavier rods. This suggests a possible future trend in nail manufacture—namely the continuous dry drawing of the coarser nail sizes from a ¼" or $\frac{5}{16}$" rod. I have noted in Mexico where much nail wire is drawn from very coarse rods, that the extra stiffness of the wire has resulted in the development of a range of non-standard nails.

A large percentage of the steel used for wire in Europe is of the Thomas grade. This is steel blown in a Bessemer converter with a basic lining and additions of lime to produce a highly basic slag. The pig iron runs very high in phosphorus. After the drop of the carbon flame there is an after-blow of about 12 min. during which the phosphorus is burnt out and goes into the slag. After the phosphorus flame has dropped the vessel is turned down and in addition to the recarburizer a considerable amount of steel scrap is thrown in. The blown metal is very hot and will stand a good deal of scrap. I don't know whether the metal is naturally hot and needs a good deal of scrap to pull it down to a good pouring temperature or whether on the other hand it is purposely run hot so as to provide an outlet for scrap. This Thomas steel can be made very low in impurities, including carbon. Americans who have come in contact with the European practice and particularly those who have noted the practice of drawing hard to small gauges, seem to have the impression that this steel is usually good for wire drawing purposes. On the other hand the European manufacturers who have noted our high speeds and heavy reduction are firmly convinced that the American open hearth steel is vastly superior to their Thomas steel. I have been through the matter pretty thoroughly. I have drawn Thomas steel in Europe and Thomas steel in America and American open hearth steel in America and again in Europe. There is good steel and bad steel in America and good steel and bad steel in Europe, but so far as the drawing of the common wire products is concerned, I believe there is nothing to choose between them. If I had to choose I would concede that good Thomas steel has the edge.

As for the wire rods, they are almost always rolled to 5 m/m which is our 6 gauge. They are generally much truer to gauge than American rods and rounder. This is due not so much to differences in the rolling mills as to a more careful and highly trained personnel. There are many Morgan rod mills in Europe and Morgan rods are generally preferred, not on account of the heavy bundles, for these bundles are commonly split up into 100-lb. units at the rolling mill but on account of their high and uniform finishing temperature with consequent open structure, uniform temper from end to end and ability to stand a large number of drafts.

The business that occasioned my last four visits to Europe was the sale of continuous wire drawing machines for working from the rod. Dry drawing was absolutely essential to their economical functioning. In making this revolutionary change in mill construction, layout, and practice, my customers had to rely on notes of rather hasty American trips, and such help as I could give them, sometimes in person and sometimes by letter or cable. There was a constant temptation in times of uncertainty to fall back on previous practice and combine some of the features of wet and dry drawing. Some very odd combinations were arrived at; in fact some things were worked out and adopted as standard practice which we in America firmly believe to be impossible. Here is a lesson for the wire industry. Nothing is impossible.

(*Please turn to page 327*)

Galvanizing Prevents Metallic Decomposition

Close Relation between Life and Rust—Zinc Chloride and Dross Formation—Oxide Elimination—Bonding Layers

By W. H. Spowers, Jr.*

(*Concluded from page 290, July issue*)

IT will be seen then that the thinner we keep these layers the more perfect will be the bond between the pure zinc coating and the base metal. The procedure for producing thin alloy layers in zinc coatings is therefore as follows:—

One: The work must be free of iron salts at the time of immersion.

Two: The wire after being washed should be protected from any oxidization whatever by the use of a neutral flux, (zinc chloride).

Three: These fluxes must be protected from burning which results from sudden quenching in hot spelter, by the use of a proper introducing agent, (zinc ammonium chloride).

Four: The wire must be immersed for as short a time as is possible to effect the weight of coating desired and at as low a temperature as is possible.

Five: The wire should be drawn through pure zinc absolutely uncontaminated by floating dross.

Six: The wire should be wiped as promptly as is practical upon leaving the kettle.

Seven: The alloying action should be stopped as promptly as possible by quenching.

Some Practical Installations

It is most important that all galvanizing be done in perfectly clear zinc uncontaminated in any way with dross and to accomplish this purpose I recommend the use of a deep pot heated on the sides well above a determined line which may be the part allotted for the accumulation of zinc dross.

Zinc dross of course consists primarily of pure zinc which has been contaminated by a small percentage of iron. As I have told you this iron comes to a small degree off the sides of the kettle and to a small degree from the work which is immersed and to a large degree from the iron salts produced by the use of the hydrochloric acid as a flux. In the use of shallow kettles or underfired equipment, however, there is another element of dross formation and that is boiling which takes place in any galvanizing kettle which is heated too low or from the bottom. The dross if boiled up from the bottom by the application of heat from below or at too low a point will in turn produce more dross because of the disastrous effect which dross in suspension has both on the work going through and the sides of the kettle.

Having eliminated by the wash, zinc chloride method that dross formed by the iron salts from the pickle we have only then to consider the dross which is formed by under-firing from the kettle and work immersed.

As the zinc becomes contaminated by the iron it settles of its own gravity to the bottom of the kettle and in order to galvanize in pure zinc the setting must be so built as to not only allow but assist this natural precipitation of contaminated zinc to the bottom of the kettle without any interference.

Greatest Heat Application Should Be Near the Top

By applying the heat to the bottom of the kettle it must pass through the dross before it can reach the pure zinc with the result that it floats the dross again and places back upon the work a considerable quantity of drossy zinc. This drossy zinc effects materially the formation of the alloy layers to which I have referred and places upon the work a coating of poor quality. I desire to call your attention to an examination which I recently made of five under-fired pans before and after drossing. Four of these kettles were using prime Western spelter and one a high grade cadmium-free zinc. The samples for examination were taken under ordinary working conditions and from the top of the kettle in close proximity to the wire passing through. In each instance the samples taken after drossing were very materially lower in iron than the samples taken before drossing thus demonstrating conclusively that from the time of drossing to the time of the next drossing the molten zinc in these pans became increasingly higher in iron content. This was also proof positive of the fact that the wire galvanized in this equipment was being coated with zinc high in iron content and is an evil which must be remedied if the product is to be of uniform and high quality. You will understand then that in any under-fired or low-fired equipment that as long as this boiling action takes place you galvanize after drossing in fairly clear zinc but from that time onward until the pan is drossed again your wire is galvanized in increasingly heavy zinc iron alloy.

Accepting then if you will the theory that the heat should be applied at the side of the kettle and not from the bottom

*Consulting Engineer on Galvanizing, 551 Fifth Ave., New York, N. Y.

**Paper presented at Wire Division of The Iron & Steel Exposition, Buffalo, June 18, 1930.

I suggest that the matter should not stop there. The greatest amount of heat as a matter of fact should be applied at the upper portion of the kettle where the greatest heat is being taken out. Less heat at the lower portion and little or no heat below a determined line allowed for the formation of zinc dross.

Actual installations of this type now in service in the straight wire field have given results which confirm the accuracy of the suggestions herewith given.

DISCUSSION

CHAIRMAN BROWN: Are there any questions?

MR. B. H. McCARTHY: (Wickwire Spencer Steel Corp.) I'd like to ask Mr. Spowers if there is any relationship between the metal being galvanized and the bending properties.

MR. SPOWERS: Yes, there is. In some instances the analysis of the iron has something to do with it. No question about it.

MR. McCARTHY: Oh, yes. Then there is another question as to the width. It has distinctly alloyed layers and yet has bending properties, where is the relationship?

MR. SPOWERS: The alloyed layers really have the most bending properties.

MR. LEWIS: May I say a word? I'd like to mention something in regard to galvanizing. They don't use any screw wipers in Europe or even lever or spring wipers. There is apparently only one kind of wiper used there. It is a steel bar across the bender kettle with little steel pins sticking up in pairs close together. It is practically a separator for the wires. The wire runs through between two pegs. The wiper is a little piece of fine wire softly annealed with asbestos string wrapped around it. It is about the size and shape of a fuzzy pipe cleaner. You know the kind.

They do it exactly like the way you put a cotton rope around type wire. It is very easy to handle splices. When the splices come through the kettle, the fellow has a hook and when the splice appears, he takes it up with this hook.

I never had a chance to check this galvanized wire and see how good it was but from the fact that it is competing with our galvanized wire in the markets, it must be all right. I'd like to know whether that method of wiping is used in this country on coarse wire, or whether anybody has any opinion as to whether it is any good. It looks very cheap.

MR. SPOWERS: What you refer to is "bobbin type wipe". That's used usually on the barbed wire process. It is not used very extensively on the heavy wires. As far as I know, although it has some very distinct and decided advantages because it is a very even wiper throughout the whole wire, it is in some cases a very desirable type of wipe.

MR. LEWIS: Of course, I have only seen a fine annealed piece. It looks simple and good.

MR. SPOWERS: Which do you think wipes the closer.

MR. LEWIS: I think the screw wiper wipes closer.

MEMBER: No question about it.

CHAIRMAN BROWN: Any further questions?

MR. GEO. PAFF, (Wheeling Steel Corp., Portsmouth, O.): Do I understand that a block of zinc will oxidize differently than if coated if there is no galvanic action?

MR. SPOWERS I said the pure zinc will oxydize more rapidly when it has the galvanic action present. Galvanizing is like a solution.

MR. PAFF: How would you explain it?

MR. SPOWERS: It is a natural formation when the zinc and iron is put together.

MR. PAFF I see. Your theory is, then, that the zinc on the coating is more or less porous. That is, porous to the carbon dioxide in the air.

MR. SPOWERS Yes, zinc coatings are almost porous just like any other coating but they are protected. Galvanic action is present between zinc and iron sufficient to protect exposure.

MR. LEWIS: If galvanized wire was kept perfectly dry would it ever corrode? Laughter).

MR. SPOWERS: I don't think that it would corrode very fast.

MR. LEWIS: If galvanized wire were kept under water would it ever corrode?

MR. SPOWERS: No, I don't think so.

MR. LEWIS: What would be needed would be an acid, is that right?

MR. SPOWERS: Yes, that's so.

CHAIRMAN BROWN: Are there any further questions?

MR. PIERSON: I'd like to ask Mr. Spowers if he considers it necessary in using the zinc chloride fluxing bath to always dry the work before it passes into the kettle, and also what flux you recommend on the kettle.

MR. SPOWERS: I believe the zinc chloride should be brought to a certain consistency, it is usually brought to a point where it's tacking, then it goes through a flux of zinc chloride.

MR. PIERSON: What is your objection to sal-ammoniac flux?

MR. SPOWERS: In the first place, it's an agent; and in the second place, it is very expensive to use and hasn't the same effect on the attachment of the zinc to the wire as does zinc ammonium chloride. If you have had experience in using both of them you will find that sal ammoniac is active too and produces iron salts.

MR. LEWIS: I notice that in Belgium there didn't seem to be any use of flux at all in galvanizing wire. They ran the

(*Please turn to page 326*)

Discussion of Films Shown at Buffalo

What Films Were Shown and What They Included—Properties of the Metals Referred to.

THE meeting of the Wire and Wire Products Division convened at the Hotel Statler in Buffalo at nine thirty o'clock, Chairman Richard E. Brown, president of "Wire and Wire Products", presiding.

CHAIRMAN BROWN: All right, gentlemen, if you will be seated we'll start this meeting. Of course you know that this is the first time we have ever had a "wire" meeting. I am indebted to the American Steel & Wire Co., for publicity work and they have been good enough to send us Mr. Kempton who will talk in connection with their film, "The Making of Steel and Steel Wire." This film goes farther than ordinarily. It starts with production and carries through to the employees' welfare work then carries you through the wire mill and shows the different process of wire. Mr. Kempton will speak in connection with this film. Mr. Kempton.

MR. E. W. KEMPTON: It's not my intention to imitate the sound pictures and as you will see this film is explanatory and has been prepared for the layman and therefore, the story as thrown on the screen is fairly complete. In a group such as this where almost everyone is thoroughly familiar with most of the processes, at least, a detailed discussion would be rather superfluous.

The picture starts with calling attention to the place that steel plays in our civilization today. Iron ore is distributed very liberally throughout the earth's crust but only in certain places is it rich enough to justify mining. The maps give the layman a fairly good idea of the relation between the various deposits and how they are brought together and how the final product is made. We only have the upper Lake Superior region showing the various deposits around the Lake. This is an interesting cut which to the layman, gives an idea of how the ore is removed from the earth.

The last time this picture was shown we were asked whether this was surface mining or quarry mining. I don't know whether it's either—perhaps it's just digging. These scoops remove about 15 tons per scoop. The unloaders remove about 17 tons per scoop.

This slide shows the safety work. Safety is one of the first concerns of foremen and the foreman is held directly responsible for the safety of his men. It would be rather interesting to have had a sound picture and hear just what he's saying to that fellow.

Once a month, each department is supposed to hold a safety meeting. The department is shut down and they have a meeting where they discuss safety and matters co-related with safety. If a man should cut himself on a piece of wire he is required to go to the hospital for attention. He must go there no matter how minor the injury is.

It will require a few minutes to change the reel. These pictures were developed for the purpose of showing to the layman the various operations and have found quite a demand among business men's clubs and Rotary clubs, in schools and colleges, and it is almost in constant use.

Inasmuch as coke is such an important item we have prepared slides covering the charging of coke in an oven. This slide shows the flow of gases into the equipment. That you see demonstrates fairly well just how the gases are prevented from escaping from the furnace during the charging operation.

(*Please turn to page 323*)

Clarence S. Arms, Consulting Engineer, Sleeper & Hartley, Inc., Worcester, Mass.

Kenneth B. Lewis, Morgan Construction Company, Worcester, Mass.

Richard E. Brown, President, Wire & Wire Products, New York, N. Y.

W. H. Spowers, Jr., Consulting Engineer on Galvanizing, 551-5th Ave., N. Y.

The Individuals Prominent at the Wire Division Meeting and Wire Show at Buffalo, June 16-20.

Clarifying the Wire Cable Question, IV

Influence of Cable Loads—Greater Satisfaction from Thicker Wires (American Practice) for Elevator Service

By R. Woernle, Stuttgart*

(*Continued from page 283, July issue*)

A NUMBER of cables of German manufacture designated by letters k b w and two American cables q and y were compared, the results being shown in Figs. 33-34.

The high value American cable q in Fig. 33 is intermediate in value to the different German cables. In Fig. 34, the German cable was superior. Both figures show the favorable influence of the arrangement (vorformung) of the cables in direct winding and the use of thicker wires in the outer layers of the strands.

Further the use of equal lengths of wire in winding the strands appears to be favorable.

Influence of Galvanizing

The wires n and u in Fig. 33 were galvanized. They have a greater value than similar plain cables agreeing with what was said in Zeit. Maschinbau, Vol. 3, 770 (1924).

Attention is called to Sieglerschmidts[1] observation that there is no appreciable difference in tensile strength of galvanized and plain wires, the author agrees with him in the case of torn and "Dornbent" samples. However, he found an appreciable difference in disfavor of the galvanized wire in a wound sample. This unfavorable behavior in connection with the wound samples contradicts the testing of the cable made of these wires because the above experiments on the length of life of the cables showed a favorable behavior of the galvanized cables.

Cables with Arranged Wires (Trulay Cables)

In Figs. 14 and 33-35, it is shown that the arrangement (Vorformung) of the wires (i. e., strands) has a favorable influence on the life of the cable.

Figure 14 shows the slower rise of the course of disturbance for the 114 wire cross and straight wound Trulay cable, in contact with the corresponding ordinary cable.

The favorable effect of arrangement on length of life decreases with increasing wire thickness.

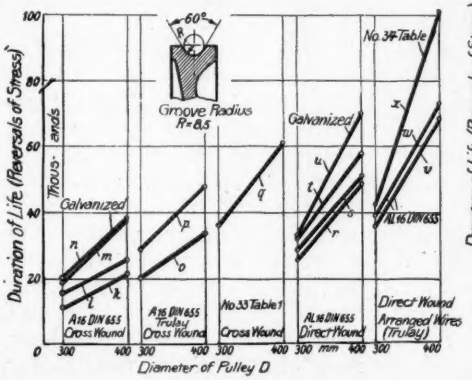
The cables with the arranged wires have a certain advantage in addition to the increased length of life. They are free from twists and are, therefore, easier to use in practice than the ordinary cables. Especially in the case of the direct wound cables which showed a more favorable length of life but which were limited in usefulness because of the strong trust, the Trulay cable has great significance.

(*Please turn to page 322*)

*Chairman, V. D. I. Wire Rope Committee. From *Zeitschrift des Vereins Deutcher Ingenieure*. Translated by W. H. Fulweiler, United Gas Improvement Co., Philadelphia.

[1] Z. Vol. 71, 250 (1927).

Fig. 33 (below). Comparison of Length of Life of Nominally-similar Cables for a Diameter of 16 mm. Fig. 34 (at right). Same comparison of Length of Life of Similar Cables for a Diameter of 13 mm.


Duration of Life (Reversals of Stress)
Thousands
Groove Radius R=8.5
Galvanized
Galvanized
No. 34 Table
A 16 DIN 655 Cross Wound
A 16 DIN 655 Trulay Cross Wound
No. 33 Table 1 Cross Wound
A 16 DIN 655 Direct Wound
Direct Wound Arranged Wires (Trulay)
Diameter of Pulley D

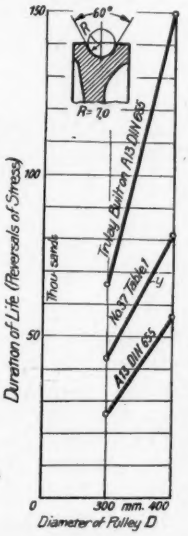
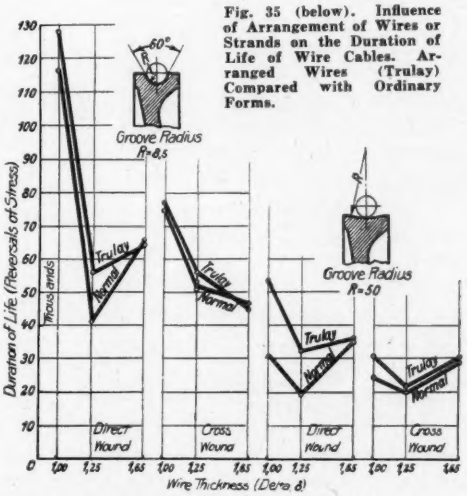


Fig. 35 (below). Influence of Arrangement of Wires or Strands on the Duration of Life of Wire Cables. Arranged Wires (Trulay) Compared with Ordinary Forms.



NEWS *of the* INDUSTRY

Foreign Trade Opportunities reported by the Bureau of Foreign and Domestic Commerce during the month of July include inquiries from the following sources: Metal fasteners for belts (45943) Quebec, Canada; steel bolts, nuts, flats, rounds and hoops (45923) Glasgow, Scotland; galvanized wire and chain link netting for fencing purposes (45924) Glasgow, Scotland; nut, bolt and wire drawing machinery (45903) Paris, France; tin and aluminum foil (45919) Glasgow, Scotland; strip and bar solder (45934) Cape Town, South Africa; wire rope and builders' hardware (46111) Bogota, Colombia; Scrap, steel, such as wire shorts, wire rods, etc., (46068) Shanghai, China; wire mesh (46070) Milan, Italy; wire netting for chicken fencing (46071) Heilbron, South Africa; nut and bolt making machines, wire drawing machinery, steel and rolling mill equipment (46245) Paris, France; underground armored cables, telephone wires, cables and accessories (46385) Montevideo, Uruguay; bolts and nuts (46288) Alexandria, Egypt; copper, zinc, lead, antimony, aluminum, tin, gold, silver, and platinum ingots (46-373) Buenos Aires, Argentina; buckles and clasps for men's belts in all kinds of plated metal (46301) Nice, France; poultry wire netting (46473) Bogota, Colombia; plain and barbed wire (46408) Buenos Aires, Argentina; iron and galvanized wire shorts (46409) Shanghai, China; wire-bending and nail-making machines, for metal working machines (46432) Chihuahua, Mexico; wire-weaving machinery (46482) Oporto, Portugal.

Notes of the German Wire Industries

The German wire cartel finds it increasingly difficult to control the domestic market. The number of outsiders, especially in the wire nail industry has increased in such a way, that the cartel has been forced to an announce fight prices in almost all German provinces. The prices have been already reduced in an extent up to 10%. The German wire rod cartel sells wire rods to the outsiders of the wire cartel only at prices, which are m 17.50 per 1,000 kilos higher, but the outsiders have found means and ways to buy wire rods from abroad especially from the Saar, wherefrom certain allotments may be imported duty free) or to buy from members of the wire rod cartel with secret rebates.

Exports of aluminum wires has taken a very satisfactory development. Compared with last year's orders show an increase by approx. 50%. East Africa is the main buyer. The present price is £ 112.10-114.0 per ton fob for the basis sizes.

German makers report of fair orders for galvanized wire nails from the West Indies and Central America, especially Guatemala, Costa Rica and Nicaragua. The present price for such nails (basis) is £ 11.0 to 11.5 per ton fob.

A German company has secured an order for 170 tons of telegraph wire from Alaska, the quantity will be shipped in one lot during July.

The German trade believes now firmly, that the negotiations, which had been recently started will lead to an extension of the German wire syndicate (which expires the end of this year). Should the cartel collapse, this will lead to the ruin of many small works, which have abandoned all their sales organization the past 5 years.

The prices for wires did not change in the second half of May and the first week in June, with exception of wire nails, for which a price of £6.8.0 per ton basis was freely accepted.

The reduction of the wire rod prices for the Far East from £7.7.0 c i f Yokohama/Kobe/Shanghai to £7.2.0 is explained by the keener American and European outsiders competition. German / Belgian / French exports to Japan amount now only to some 6,000 tons monthly as compared with 7-8,000 tons monthly last year.

American inquiries for wire rope continue to be satisfactory. The most imported rope quality is 2 in. diameter 12 x 6 cores, of which German works sell approx. 100-150 tons monthly to American importers.

The trade with Argentine, Uruguay and Brazil in fencing wire is unusually quiet, but exporters report of a very steady demand for oval galvanized wire of 12/14 BWG with 110/120 kilos tensile strength per square mm, for which the price is £14.0 to 14.10 per ton fob. As the same length of the oval steel wire weighs much less, than usual fencing wire, the demand for this material is increasing.

Exports of music wire from Germany to the United States has been considerably reduced, as in the years 1924/26 Germany exported some 60-100 tons high grade music wire to the USA per month, at present only 20-35 tons. This is being explained with the circumstance that the American makers were able to reduce the price for American made wire faster than the European producers.

British Cable Company Does Well

Callender's Cable & Construction Co.'s recently issued report is very gratifying, especially in view of the generally poor showing of industrial companies. It is heightened by the statement that trade materially improved during the latter months of 1929 and that this improvement has since been maintained. Net profits for

1929 increased from £287,081 ($1,435,405) to £330,412 ($1,652,060), and the usual dividend of 15 per cent is maintained on the capital enlarged by the capital bonus of 20 per cent distributed a year ago and also by an issue of shares in connection with the purchase of the business of W. T. Glover & Co. The result of the purchase of this business has come up to the expectation of the directors and the acquisition presumably contributed to the larger earnings. Large additions have been made to the reserve. Out of the balance of £570,246 ($1,852,230) brought forward from 1928, £238,730 ($1,193,650) was transferred to the reserve, and a further £347,270 ($1,736,350) was also placed to the reserve from an undisclosed source. Thus, in spite of the deduction of £186,000 ($930,000) in connection with the capital bonus of last year, the reserve now stands at £800,000 ($4,000,000) compared with £400,000 ($2,000,000) in 1928. The increase in assets to correspond with the additions to the capital and reserves has taken place mainly in investments, which have risen from £671,000 to £1,313,000 ($3,355,000 to $6,565,000). Of this sum £490,805 ($2,454,025) is invested in subsidiary companies. Many of the other investments are in associated businesses, but it would greatly add to the clarity of the balance sheet if holdings of gilt edged securities were shown separately from other investments. Excluding investments the company's balance sheet still discloses an excess of floating assets over current liabilities amounting to about £1,250,000 ($6,250,000).

Personal Mention

Roy V. Wright, managing editor, Railway Age, New York, N. Y., has been nominated for president of The American Society of Mechanical Engineers for 1931. Election will be by letter ballot of the entire membership, closing Sept. 23. Other nominees, as presented by the regular nominating committee are: Vice Presidents: **William A. Hanley,** chief engineer Eli Lilly Co., Indianapolis, Ind.

Thomas R. Weymouth, president, Oklahoma Natural Gas Corp., Tulsa, Okla.

Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J.

Managers — **W. L. Batt** president, S K F Industries, Inc., New York, N. Y.

H. L. Doolittle, chief designing engineer, Southern California Edison Co., Los Angeles, Calif.

H. L. Whittemore, chief, Engineering, Mechanics Section, Bureau of Standards, Washington, D. C. Representatives—American Engineering Council: W. R. Webster, Bridgeport, Conn.; R. V. Wright, New York, N. Y.; J. W. Roe, New York, N. Y.; Robert Yarnall, Philadelphia, Pa.; E. N. Trump, Syracuse, N. Y.; B. E. Hull, Houston, Tex.; E. O. Eastwood, Seattle, Wash.; W. Trinks, Pittsburgh, Pa.; Warner Seely, Cleveland, O.; and William S. Conant, Washington, D. C.

COMING EVENTS

Aug. 24-29. 3rd International Congress of Applied Mechanics, Royal Technical Inst., Stockholm, Sweden. Information from Sec'y., Amer. Soc. Mech. Engs., 29 West 39th St., New York, N. Y.

Sept. 9-12. Annual Autumn Meeting, Inst. of Metals, South Western Hotel, Southampton, England. Sec'y., G. Shaw Scott, 36 Victoria St., London, S W 1.

Sept. 14-21. Engineering and Chemical sessions, International Exposition, Liege, Belgium.

Sept. 22-26. Annual Convention, Amer. Soc. for Steel Treating, Stevens Hotel, Chicago, Ill. Sec'y., W. H. Eiseman, 7016 Euclid Ave., Cleveland, O.

Sept. 22-26. 12th Annual National Metal Exposition, under auspices Amer. Soc. for Steel Treating, Stevens Hotel, Chicago. Sec'y. as above.

Sept. 22-28. National Metal Congress, Stevens Hotel, Chicago, in conjunction with Amer. Soc. for Steel Treating annual convention, Metals and Iron & Steel Divisions, Amer. Inst. Mining & Metallurgical Engs., annual Fall meetings, Machine Shop Practice Division, Amer. Soc. Mech. Engs., and Amer. Welding Society.

Oct. 1-11. 6th International Exhibition of Inventions, Central Hall, Westminster, S W, London. Sec'y., G. Drury Coleman, 39 Victoria St., Westminster, London, S W 1.

Dec. 1-6. 51st Annual Meeting, Amer. Soc. Mech. Engs., Engineering Societies Bldg., West 39th St., New York. Sec'y., Calvin W. Rice.

C. E. Stephens was selected to occupy the new position of commercial vice president for the Atlantic Division; **N. G. Symonds** for the Central Division and **W. R. Marshall** for the Pacific Division. These have been created by the Board, Westinghouse Elec. & Mfg. Co.

R. L. Davis, engineer in charge of radio development at the East Pittsburgh plant, Westinghouse Elec. & Mfg. Co., has been named manager of the Radio Engineering Department of the Chicopee Falls plant.

V. E. Trouant has been appointed to the radio engineering position at East Pittsburgh made vacant by the transfer of Mr. Davis. At Chicopee Falls, Mr. Davis will succeed H. J. Nicholas, resigned.

D. G. Little will continue as chief engineer of the Radio Engineering Department.

Roland M. Hussey, superintendent of wire mills, Jones & Laughlin Steel Corp., Aliquippa, Pa., was elected president of the Association of Iron & Steel Electrical Engineers, at the annual election held at Buffalo in June. F. O. Schnurr, Bethlehem Steel Co., Sparrows Point, Md., and J. J. Booth, National Tube Co., Gary, Ind., vice presidents, and James Farrington, treasurer.

Ralph E. Day has been elected president, Bridgeport Brass Co., Bridgeport, Conn., succeeding Charles E. Beardsley, reigned. Mr. Day is well known in the non-ferrous and wire fields, having been asst. supt. and supt., Amer. Brass Co.'s west brass branch, Waterbury, sup. Hastings-on-Hudson plant, Amer. Brass Co., vice president and general manager, Bridgeport Brass Co. He is a graduate of Lehigh University.

No Rejects

Personalities and Gossip of the Wire Industry as Told by a Roving "Trouble Shooter"

MECCA for the Mohammedans, Jerusalem and Rome for Christians and Jews, but for any one whose religion and business is wire drawing a journey should be made to Worcester, Mass. In this city, tucked neatly away among the hills of the foremost New England commonwealth, is the shrine of the American Wire Industry. To this locality came men whose names are forever linked to their adopted homeland and their chosen industry.

Many of the original American wire drawers were smuggled into this country from England. The procedure was necessary for the fond motherland disliked to permit her skilled sons to waste their efforts in the rock ribbed wilderness along the North Atlantic. Middle aged folk living in and near Worcester still tell of their fathers and grandfathers who were shipped from England in hogsheads, so great was the necessity for secrecy in their departure from home.

It seems only fitting that a definite effort has been made to record the efforts of the pioneers of the industry in this country. In Worcester there is a museum devoted solely to wire. The museum is the property of the Amer. Steel & Wire Co. and bears that designation, but it is in no sense narrow. Its scope is as broad as the wire industry. It contains objects collected from all parts of the work, wire made in this country before the revolution and articles made from wire before the Reformation. It contains antique contraptions for making wire, models of inventions for doing all sorts of things to wire, in fact practically everything antique and modern that pertains to the ancient and honorable trade. Arthur G. Warren, the first curator of the Museum has worked diligently for many years to acquire and arrange the material and data included in the various displays. While it is true that he has been a paid employee of the company, no man in the industry today brings more real enthusiasm and love for his work than does he. Some day his efforts will be the only remaining connection we have with the past of the industry and then will his work begin to be appreciated.

He is known to many of you now and if you don't know him I dare say he knows or knows of you. He has a ready fund of wire lore and history that seems limitless and is a very interesting man to chat with. When you are up Worchester way drop around to the Museum on Grove St., and learn for yourself the antiquity of your industry, learn the part wire has played in this ever-changing world.

* * * * *

Gore and Lemon (what a liquid combination!) are Superintendent and Assistant respectively of the wire mill of the Williamsport Wire Rope Co., at Williamsport, Pa. The mill for which they are responsible is one of the finest in the country. They have more to show off than dozens of others who think that single holeing is very modern and keep their doors closed. Bob Gilmore, president of the company, must have had a great vision. The whole atmosphere of the place is quiet efficiency and contentment, and their costs are in line with the lowest. They have a waiting list of future employees, so great is the desire on the part of those who know, to work for them.

* * * * *

Out in Geneva, O., where the American Fork & Hoe makes golf shafts, Carl Wright, the master mechanic, has a home which is often mistaken for the Geneva Country Club. Somebody suggested that he must have broken one of the much heralded records for production to be able to get himself rigged out like that. Anyhow we saw some samples of the work done at his plant in the Buffalo Show and if they were just ordinary samples he deserves to spread himself.

* * * * *

Big Jim Darrow, Assistant Superintendent of the Waukegan Works of the American Steel & Wire, persists in believing that Barney Nystrum is all wet. At least all of the wire he handles is. Barney is a shrimp alongside of Big Jim and it is comical to see and hear them ragging each other.

* * * * *

Paul Fast, superintendent of Belden Manufacturing Co.'s wire mill in Chicago, has an idea since the advent of his 4-month old heir, that no one ever before had a son. He forgets perhaps that his father may have had a son who was considered bright, at least that may have been true at 4 months of age. Customs have changed. We get modern and disdain mid-Victorian virtues but fathers never seem to realize that a son may be only just another boy after all. Well, never mind, Paul, we were a son once and father had it all planned to push a perambulator down Pennsylvania Ave. at our inauguration just to show that he, too, had a hand in president making.

* * * * *

E. A. Renfer, superintendent of the Kenosha Mill of the Anaconda Wire & Cable Co., did not go to see Bobby Jones win the National Open Golf Championship at Minneapolis. In

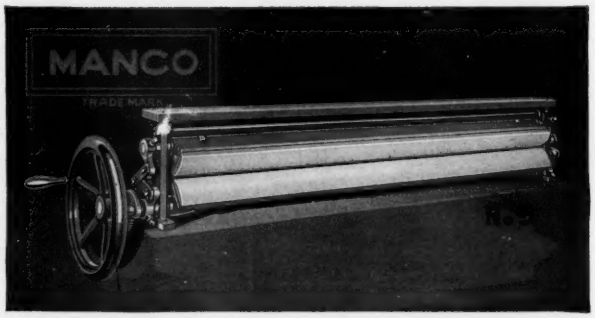
(*Please turn to page 321*)

New Machinery and Equipment

Description of Recently Developed New Tools of Interest to the Wire Industry

Manco Screen Wire Stretcher

THE attached illustration shows a very plain, simple, efficient and easily operated machine for stretching screen wire cloth preliminary to tacking or stapling to screen door and windows frames. The machine will handle wire cloth up to 48 in. wide and draw it taut without strain or damage. As will be noted, it is entirely hand



The Manco Screen Wire Stretching Machine.

operated by means of hand wheel, which controls a ratchet and pawl for opening and closing the clamping jaws. These are wood and faced with heavy brake band lining. This stretcher may be attached to any ordinary work-bench or to the end of a Manco No. 4 window frame and screen door clamping machine. Net weight is about 100 lbs. Manufactured by Manco Mfg. Co., Bradley, Ill.

The Kipp Air Grinder

THIS is a new small tool for die makers, machinists on fine work and tool makers that may prove useful on some phases of wire die or other wire work. It is a very small drill or grinder driven at an exceedingly high speed. The size is about twice the diameter of a lead pencil and the rotative speed is said to be 40,000 r.p.m. While the usual grinder wheels furnished with it are of ¼-in. diameter and smaller or slightly larger, the makers, the Madison-Kipp Corp., Madison, Wisc., would cooperate with anyone interested who wanted to use still smaller wheels on the order of 1/16-in. Wide shop use of this new and different tool should develop as it becomes known and is tried out on various kinds of very small and accurate work.

New Wire Cable Construction

THE Bishop contact cable, now being manufactured under the Navy patent, consists of a water proof, dust proof and acid proof cable about the size of an ordinary lead pencil, which, when compressed at any point in its entire length, throws a switch, turns on a light, sounds a signal or does a thousand things which formerly required direct contact with a button or switch at a given, stationary point. In other words the cable is one continuous switch along its entire length, whether it be fifteen or fifteen hundred feet.

The myriad of uses to which the cable may be put are limitless: in the home for electrical devices, lights, radios; in banks and other commercial places of business as a protection against holdups; in mines and other underground operations where, in an emergency, signal buttons may be at remote places; in power plants as life savers and time savers, and finally in automatic traffic control.

The cable has a novel type of construction. Two conductors, enclosed by the outside insulation, are left bare but separated from each other by an "isolating cushion" of rubber. When pressure is applied this "isolating cushion" yields and permits the outer conductor to contact with a wire, which, in turn, is always in contact with the inner conductor, thus closing the circuit. When pressure is relieved the "isolating cushion" returns the outer conductor to its normal position. Made by The Bishop Wire & Cable Corp., New York.

Used with a relay switch the Bishop Control Contact Cable becomes operative at the point of pressure—wherever the operator happens to be standing.

Micro-Weld Butt-Welding Device

THIS butt-welder works successfully on No. 20 wire and is so constructed and operated that anyone can operate it and do first-class work. It is small, compact, easily moved from place to place on a special truck that permits wheeling it, can be equipped for 110 or 220 volt current as desired, and its electrical equipment is sturdily constructed so as to need little or no attention. The clamps and dies are set at the forward edge, with two controlling

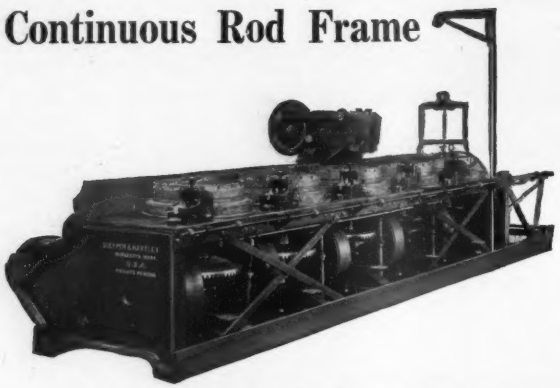
(*Please turn to page 320*)

Section through the Bishop Contact Cable.

Sleeper & Hartley TRADE MARK

Practical Continuous Wi

Continuous Rod Frame



(Patented June 3, 1924—May 12, 1925—Others pending)

Capacity—No. 5 rods to No. 14—15 wire.

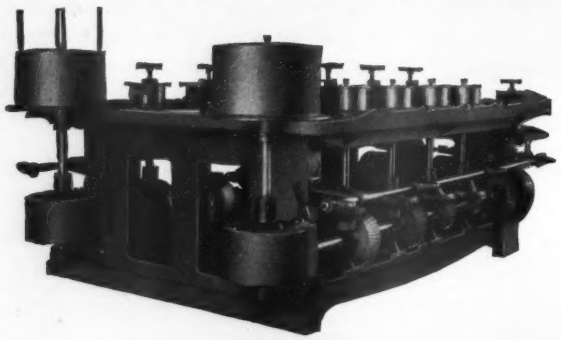
Automatic Compensation for Speed of Heads.

Ball or Roller Bearings used Throughout.

No Differential Gearing Whatever.

Made with 3, 4 or 5 Blocks as Desired.

Double 5-Draft Dry, Intermediate



Capacity—No. 14 to No. 23, high or low carbon wire.

Average Operator handles 3 to 4 blocks.

Daily Runs—No. 14-19 wire (4 hole), 1400 lbs. per Block.
No. 14-20 wire (5 hole), 1100 lbs. per Block.

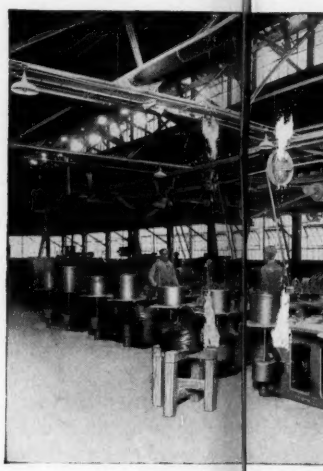
More than 550 heads of this improved model in continual operation

WHILE we also manufacture Sin e Hole especial pride in the quality o our Co which have gained a reputation of s eriorit

Using the experience gained un r actua tation, we are able to present to the ade a tinuous Wire Drawing Machines.

All of our machines are of the la st typ ly used and emphasis is laid on rigid on struc the economy of floor space effected, al our ma pactness and yet with a simplicity of esign t necessary. All are constructed of th best guaranteed.

Our machines are ready to go in p roduc No long term "training" or "try-out pe riods Hartley Machines.



Battery of Double x-Draf Machines Drawing High Carbon ire in Wire Co., orceste

Capacity—No. 16 to N 22, high

Average Operator cares r four

Daily Runs:—4000 lbs ow carb 3000 lbs igh car

Direct driven with silent chai Cut gea bearings. Variable peed for

American Agents

NEW YORK TERRITORY—Triplex Machine Tool Co.
PHILADELPHIA TERRITORY—Swind Machinery Co.
CHICAGO TERRITORY—Neff, Kohlbusch & Bissell, Inc.
SAN FRANCISCO—L. G. Henes Machine Tool Division of Jenison Machinery Co.
LOS ANGELES—L. G. Henes Machinery Co.

SLEEPER & HA

WORCESTE MAS

s Wire Drawing Machines

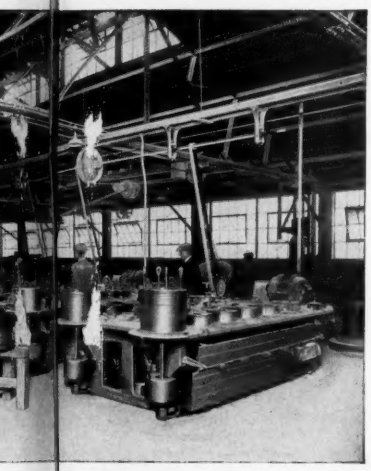
Sleeper & Hartley TRADE MARK

e Sin e Hole Wire Drawing Machines, we take
ty o our Continuous Wire Drawing Machines,
of s eriority in the Wire Mill field.

d un r actual working conditions and experimen-
the ade a full line of time-tried, reliable Con-
.

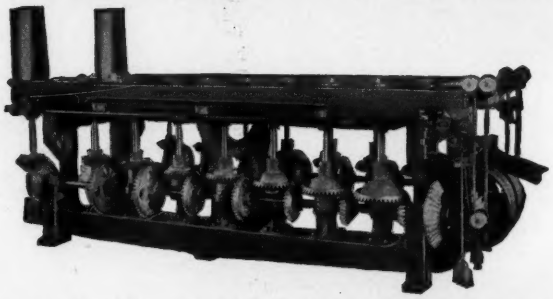
the l st types. Anti-friction bearings are wide-
rigid on struction. A feature of the entire line is
ed, a ur machines being built with great com-
ty of esign that allows for easy adjustment when
of th best materials throughout and are so

go in production on delivery at the Wire Mill.
y-out periods are necessary with Sleeper and



uble x-Draft Dry Continuous
rbon ire in the Plant of The Thompson
Co., orcester, Mass.
to N 22, high or low carbon wire.
cares r four blocks (two machines).
00 lbs w carbon wire in 10 hours.
00 lbs igh carbon wire in 10 hours.
t chai Cut gears throughout. Anti-friction
Variable peed for finishing block.

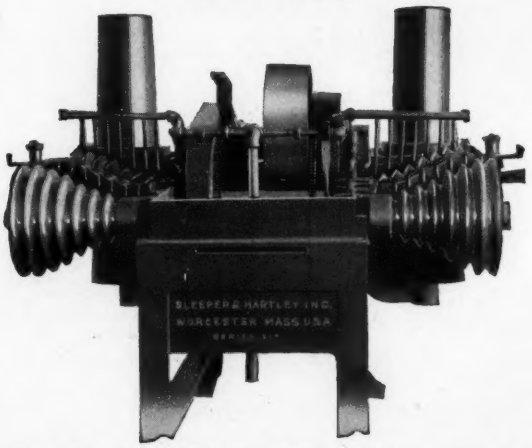
Double 8-Draft Wet, Fine Wire



Capacity—No. 22 to No. 36, high or low carbon wire.
Average Operator handles six blocks.
Daily Runs—No. 22-33 wire (8 holes) 660 lbs. of wire per 10-hour working day.

We have manufactured several thousand of these heads for Wire Mills throughout the country

Improved Double 8-Draft Wet, Cone Type



Capacity—No. 13 to No. 24, high or low carbon, or the finer woven screen wires.
Average Operator runs 6 to 12 machines, producing up to 1500 pounds of wire per day.

Machines staunchly built in six or eight drafts. Cones travel at 135 R. P. M., and draw 283 feet of wire per minute. Floor space —5′ 6″ by 4′ 6″.

HARTLEY, INC.

TE MASS., U. S. A.

Foreign Agents

UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4

MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.

AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty. Ltd., Melbourne

JAPAN—Andrews & George Co., Tokyo

A REVIEW *of* RECENT PATENTS

No. 1,761,415, MACHINE AND METHOD FOR MAKING CHAIN. Patented June 3, 1930, by Edwin F. M. Speidel and Karl C. Augenstein, Edgewood, R. I., assignors to Automatic Gold Chain Co., Providence, R. I. A firm composed of Edwin F. M. Speidel and Albert E. R. Speidel, both of Edgewood, R. I. This machine is adapted for making a mesh-like metal fabric for wrist watch straps and the like and while a flat stock is suggested, other shaped stock might be used.

No. 1,761,482, APPARATUS FOR MANUFACTURING WIRE ROPE. Patented June 3, 1930, by Johann Laubenthal, Cologne-Mulheim, Germany, assignor to Felten & Guilleaume Carlswerk A.-G., Cologne-Mulheim, Germany. This device is intended for the purpose of prebending rope wires in the helical form, which they possess in the completed strand of wire rope, without any twisting around the axis of the wires.

No. 1,761,565, CABLE. Patented June 3, 1930, by Emil Kaempf and Donald P. Dalzell, Aldwych, London, England, assignors to Western Electric Co. Inc., New York, N. Y., a Corporation of N. Y. According to the present invention, a certain system of torsions for the pairs of a pair cable, for the phantoms of a quadded cable, for the star quads of a star-quad cable, or for the stranding units composed of pairs of multiples of pairs in any other type cable is used with given stranding torsions and, in the case of quadded cable, a certain system of pair torsions is used with quad torsions.

No. 1,761,739, SPRING COILING MACHINE. Patented June 3, 1930, by Michel Nigro, Worcester, Mass., assignor to Sleeper & Hartley, Inc., Worcester, Mass., a Corporation of Mass. Particularly, this invention relates to an arbor for use in wire spring coiling and cutting machines. It is claimed that the arbor permits the coiling and cutting of wire springs having a very much smaller diameter than any springs which it has been heretofore possible to coil and cut on existing machines.

No. 1,762,167, HELICAL COILER AND ASSEMBLER. Patented June 10, 1930, by Ferry M. Forbes, Detroit, Mich., assignor to Premier Cushion Spring Co., Detroit, Mich., a Corporation of Mich. The machine of this invention includes a holder into which the helical spring issuing from the forming element is received. By means of suitable timed mechanism, the formed spring is gripped in the holder, severed from the original wire, and the holder is then turned to a position which brings the formed spring into a line intersecting the line of ejection from the forming element. While the formed spring is held in such position, another spring section is coiled in the forming element and ejected therefrom so that it passes from the first formed spring. After the formation of the second spring, the cutter comes into operation, and ejector discharges two intersected springs.

No. 1,762,289, COIL HANDLING APPARATUS. Patented June 10, 1930, by Frank H. Dahlstrom, Worcester, Mass., assignor to Morgan Construction Co., Worcester, Mass., a Corporation of Mass. Particularly, this invention involves the provision of mechanism for securing successively the elevation, from a reeling device, of each coil that is formed thereon, and the sidewise transfer of each coil so elevated to a conveyor or the like, whereby the reeling device is rendered available at once for the formation of another coil.

No. 1,762,304. HANDLING OF COILS OF WIRE AND THE LIKE. Patented June 10, 1930, by Myles Morgan, Worcester, Mass., assignor to Morgan Construction Co., Worcester, Mass., a Corporation of Mass. This is a lever-controlled device, designed for transferring to hooks the bundles of wire from the conveyor.

No. 1,762,968. COMPOSITE CONDUCTOR. Patented June 10, 1930, by Frank F. Farnsworth, Flushing, N. Y., assignor to Bell Telephone Laboratories, Inc., of New York, N. Y., a Corporation of N. Y. This conductor comprises a number of component wire strands in close contact and a thin layer of molybdate powder between the component strands.

No. 1,762,996. LOADING OF SIGNALLING CONDUCTORS. Patented June 10, 1930, by Victor E. Legg, East Orange, N. J., assignor to Bell Telephone Laboratories, Inc., of New York, N. Y., a Corporation of N. Y. The invention involves a long, loaded submarine cable, having the terminal sections loaded with a greater thickness of loading material than the central section, the loading material on the loaded terminal section having a lower but more constant permeability and lower resistivity than on the central section.

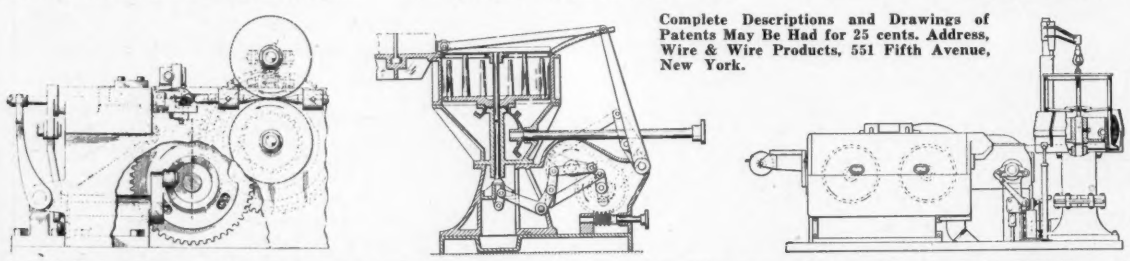
No. 1,763,255. METHOD OF BINDING THE ENDS OF ELECTRICAL CONDUCTOR CORDS AND AN APPARATUS USED IN SUCH METHOD. Patented June 10, 1930, by William A. Rankin, Rochester, N. Y. The method, used particularly in binding the ends of conductor cords having two parallel wire conductors enclosed in a single covering, consists in impregnating the covering adjacent the end with a binder (phenol formaldehyde condensate or the like), slitting the covering on both sides between the cords in the impregnated portion, and molding the slit portion of the covering to conform to the two conductors.

No. 1,763,584. WIRE NETTING FOR AIRSHIPS. Patented June 10, 1930, by Paul Helma and Kurt Bauch, Akron, O., assignors to Goodyear-Zeppelin Corp., Akron, O., a Corporation of Del. An object of the invention is the provision of a wire netting adapted to support portions of the gas cells employed in rigid airships, the several elements of the wire netting being connected together in such a way that wire crossing is prevented.

No. 1,765,228. WIRE LOOP BENDING MACHINE. Patented June 17, 1930, by Gustav H. Gebhardt, Philadelphia, Pa., assignor to Proctor & Schwartz, Inc., of Philadelphia, Pa., a Corporation of Penna. This machine is especially intended for the twisting of loops formed at spaced intervals along the selvage edges of wire mesh screens, so that the loops will be in a plane at right angles to the plane of the fabric, and permit the adjacent edges of adjacent screen sections to be pivotally connected.

(*Please turn to page 334*)

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 551 Fifth Avenue, New York.



At Left, Forbes' Helical Coiler and Assembler, 1,762,167. Center, Dahlstrom's Coil-Handling Apparatus, 1,762,289. At Right, McMullan and others' Wire-drawing Apparatus, 1,765,437.

Domestic Exports and Imports of Wire and Wire Products

Exports of iron and steel wire and wire products from the United States in April and May, 1930

(In gross tons)

Items	April 1930	May 1930	May 1929	Year through May 1930	Year through May 1929
Wire rods	4,299	4,535	3,197	21,372	20,286
Plain wire	3,339	2,664	3,518	13,709	22,338
Barbed wide and woven wire fencing	4,763	4,462	5,409	17,842	29,293
Woven wire screen cloth	102	152	142	721	752
Wire rope	468	527	505	2,270	3,183
Insulated wire and cable	44	34	115	309	549
Other wire and manufactures	650	634	821	3,712	4,742
Wire nails	666	623	513	3,191	6,720
Nails other than wire	510	632	482	2,710	3,424
Tacks	60	40	55	209	1,283
Bolt, nuts, rivets, except track	908	990	1,234	5,242	6,921

Imports of iron and steel wire and wire products into the United States

(In gross tons)

Items	April 1930	May 1930	May 1929	Year through May 1930	Year through May 1929
Wire rods	1,019	490	2,778	4,923	7,260
Barbed wire	406	283	360	2,073	2,353
Round iron and steel wire	487	829	467	2,523	2,971
Steel telepgraph & telephone wire	16	1		18	
Flat wire and strip steel	114	110	346	665	941
Wire rope and strand	311	248	206	1,236	1,008
Other wire	19	5	77	164	264
Nails, tacks and staples	322	229	1,099	1,864	3,461
Bolts, nuts, rivets and washers	58	59	11	214	104

During May, exports in iron and steel products declined to a total of 196,120 tons. Imports remained virtually stationary at 52,297 tons. Trade with Canada rose. Trade with Japan declined by an almost equal amount. Shipments of iron and steel wood screws mounted to 742,767 gross valued at $74,317, while brass wood screws increased to 32,662 gross, but decreased in value to $10,333.

Imports of card clothing totaled 6,888 square feet, valued at $11,271—the United Kingdom supplying 6,363 square feet, valued at $10,330 with the remainder coming from Germany. Imports of wire cloth and screening amounted to 32,658 square feet—19,598 square feet coming from Germany, 8,364 from Canada and 4,696 from France.

The trade in wire heddles declined sharply—only 836,000 being received in May. Of this quantity, 367,000 came from Germany, 252,000 from Switzerland, and 217,000 from France. Receipts of wood screws were also much lower in May—totaling only 16,750 gross, valued at $1.760. Of this quantity, 10,650 gross, valued at $1,048, came from Sweden and the remainder from the Netherlands.

Exports of small electrical tools and equipment decreased slightly as did copper wire. Wiring supplies and line material increased both for the month of May and five months ending May 31st. Insulated copper wire and cable decreased for the month and the yearly period to date. For the first time figures are available on the character of such insulated wires and these new break-down figures show that rubber covered, weatherproof and telephone wire make up 1/3 of the total and that insulated copper wire make the remaining 2/3.

German imports increased slightly, but plain wire imports decreased by 1,234 tons for the month of May.

H. M. Gilbert, vice-president in charge of sales, will head the new sales headquarters of the Central Alloy division, Republic Steel Corp., at Youngstown, Ohio. The offices were formerly at Massillion.

ELIMINATE SOLDERING WASTE

Separate fluxes waste 50% of your soldering time, labor and materials. Eliminate them by using Kester Flux-Core Solder. It will cut you costs in half, at the same time doubling your efficiency and output.

Kester Flux-Core Solders include a full line of Industrial solders: bar and wire, as well as 48,000 flux-cored wire solders. A specific Kester Solder for every soldering need. Consult our Research Department in selecting an efficient solder for your purpose; no obligation.

Write today

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4246 WRIGHTWOOD AVE.
CHICAGO
Incorporated 1899

KESTER FLUX-CORE SOLDER

AMERICAN PRESSED STEEL REELS

PRACTICALLY INDESTRUCTIBLE
STANDARD TYPES 2½ IN. TO 8 FT.
SPECIAL TYPES MADE TO ORDER
WRITE FOR CATALOG

THE AMERICAN PULLEY CO.
PRESSED STEEL
PULLEYS HANGERS HAND TRUCKS
MISCELLANEOUS STAMPINGS
4200 Wissahickon Ave., Phila., Pa.

WIRE DRAWING DIAMOND DIES
IN NICKEL STEEL SETTINGS

Manufacturers for Over 35 Years
[Originators of the Steel Setting]
F. KRAUSE & CO., Inc.
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"The House of Service"
Bellet Diamond Die Works
Manufacturers of
DIAMOND DIES
Factories { Trevoux—France / New York, N. Y.
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Industrial Accounting
For Executives
By John R. Bangs, Jr.
New Practical Book—Just off the Press
2 Parts—21 Chapters—449 Pages
103 Diagrams and Illustrations
Price $5.00 Postpaid
Wire & Wire Products
551 Fifth Ave., New York

The Waterbury Wire Die Co.

Diamond, Composition and
CHILLED IRON DIES
Waterbury, Conn.

New Machinery

(*Continued from page 315*)

handles directly behind them, and the heat switch on the surface just beneath these. At the right and projecting upwards is a light fixture, ordinarily serving as a shield for an electric lamp but providing a convenient handle when not used on the truck. Clamps and dies can stand great strain, the top of the dies pivots and always closes flat on the wire. Bottom dies are of hard-rolled copper with V grooves for all wire gauges. The handles control these and enable the operator to adjust the ends of the wires in proper position easily and quickly. They are opened and closed as easily as scissors. Operating and limit switch, combined, are attached to easily removed plate at right-hand end, have tungsten contacts so as not to burn or char and serve for years. Heat switch has four steps so heat can be varied to suit nature and speed of work, a great saver of current on certain kinds of welding. Made by Micro Products Co., Peoria, Ill.

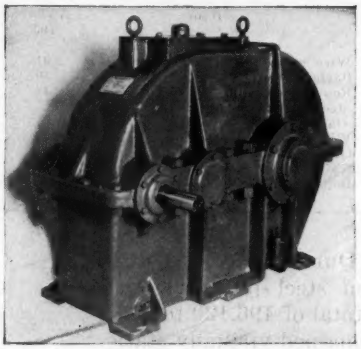
Westinghouse-Nuthall Speed Reducers

TYPES SH and DH speed reducers are new Westinghouse-Nuttall standard single and double-reduction units for use in general industrial and mining operations. They are of the non-planetary design with shafts arranged in a horizontal plane, and have either right or left-hand assembly as desired. Both types are made in twelve sizes providing a total of twenty-eight standard reduction ratios ranging from 2.82:1 to 70.5:1 and having capacities of 1 to 635 h. p.

In Type SH units efficiency at full load is 98-99% and in Type DH units 96-98%. These speed reducers are conservatively rated on the basis of torque to be transmitted in continuous service, with ample allowance for 100% overloads occurring at starting and momentarily during operation.

The Westinghouse - Nuttall single-helical gearing has been adopted as standard for these units following their outstanding success in many hundreds of installations. Gears are hobbed from forged blanks of .40-.50 carbon steel for all except a few of the largest units, the gears for which are hobbed from thoroughly annealed cast steel.

Advantages obtained with helical gearing are freedom from necessity for close axial alignment of pinion and gear and retention of original tooth form permitting a new pinion to be mated with a worn gear or vice versa. Shafts of all units are machined from heat-treated .40-.50 carbon forged steel.



The Westinghouse Type DH-18 Speed Reducer.

In Types SH and DH units Timken and Hyatt bearings have been embodied. A single Timken bearing is used at each end of all high speed and intermediate shafts. On low-speed shafts a Hyatt bearing is used at the extention end and a double Timken bearing at the closed end.

Cast from a fine grade of close-grained grey iron, the two-section cases are generously proportioned and ribbed at the points of greater stress, providing ample strength and rigidity to insure proper alignment of unit and parts. Adjoining faces are accurately machined and securely held together with through-bolts, forming an oil-tight, dust-proof joint without the use of gaskets. Thorough lubrication of the gearing and bearings is supplied by a simple positive splash system. The bottom section of the case serves as the reservoir for lubricating oil.

No Rejects

(*Continued from page 314*)

fact he stays just about as far from a course as he can in these days of Tom Thumb courses. It seems his face had an unfortunate experience at his company's outing last year. They say he yawned just at the wrong time and a hole in one specialist with poor eyes made a mistake.

* * * * *

It is too bad that the old debating society up at Palmer had to be broken up. Carl King's assistant, Stanley Hunt, has taken his leave of the Wickwire Co. via the vacation route. Stanley's health has been none to good since a deluded workman made a target of him some 2 years ago. We feel sure that Stanley will come back to the wire industry as soon as he has regained his health and do the good job we all know he can.

* * * * *

Hitchcock, president of the Atlantic Wire Co., at Branford, Conn., never seems to learn, but he does. Seems is a pose. When business comes back that boy will be geared up to get much more than his share of the specialty wire business. Arthur Jenkins, his wire mill superintendent, and he make a splendid pair, both present to the competitive world the proper "Oh! we just wish we could" attitude while all the time they are doing it just a little better and maybe a little more reasonably.

Wire Rod Cartel Reduces Program

At its recent conference at Antwerp, the European Wire Rod Cartel decided to reduce the tonnage program from 485,000 tons to 425,000 tons for the third quarter of the year. Members admitted that the Wire rod market, which has hitherto been considerably steadier than other metallurgical markets, had recently shown signs of weakness. The c. i. f. price for Japan has been lowered to $35.50, a drop of $1.25, in consequence of the weakness of the Japanese market.

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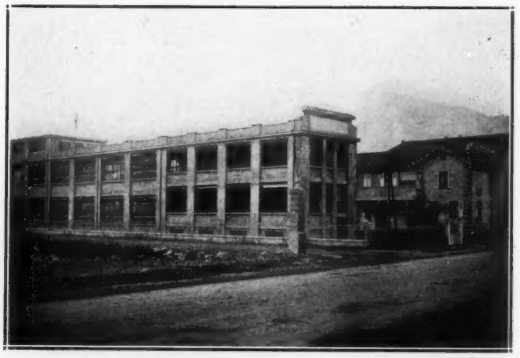

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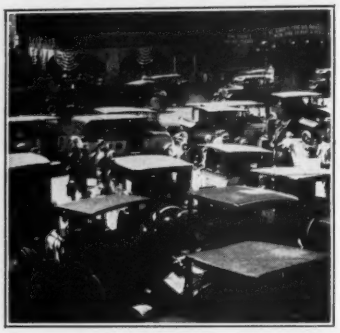

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Clarifying the Cable Question

(*Continued from page 311*)

The Trulay cable, however, has a less certain splicing point compared with ordinary cables.

Influence of Type of Bending (S-Bending)

For a cross wound cable, this type of bending (crooked-straight-contra crooked) showed a decrease of 25% in the duration of life as compared with bending crooked-straight-crooked under similar circumstances. With a direct wound cable, the decrease was 40%.

As previously stated (Maschinebau, Vol. 3, 765 (1924), and in agreement with Herbst[2], experiments with small samples are of little significance for practical purposes even if carried into the field of chemical analysis and metallurgical experiments.

Summary

The necessity of durability experiments for the clarification of the cable question and for arriving at a sound basis for specifications for cable wires was the "raison d'etre" for this series of experiments.

The foregoing partial findings which, of course, refer only to the cables studied, clear up a certain preliminary field and seem to be suitable as a point of departure for the expert in the study of cables. The experiments are set forth for the enlarging of the findings to date. Especially are other experiments to be made for the illumination of the behavior of wire cables under these special circumstances which appear in connection with the winding of the driving pulley (Treischeibenwinden). This work was graciously subsidized by the Society of German Science (Notgemeinschaft der Deutschen Wissenschaft).

[2]Z. Vol. 72, 349 (1928).

(The End)

Charles E. Seeley, formerly with the wire goods division, Wickwire Spencer Steel Corp., Worcester, Mass., has been made superintendent, Gatch Brush & Wire Goods Co., Baltimore.

Discussion of Films

(*Continued from page 310*)

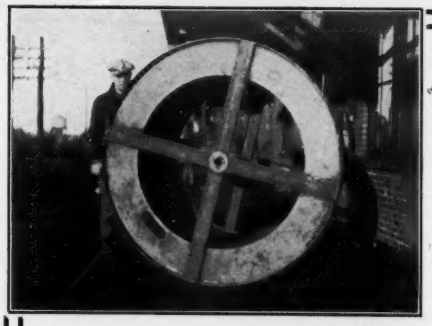
These, of course, are approximate figures in the cross section of one of the stoves, first showing how the stove is heated from the gases from the glass furnace. This you see demonstrates pretty well what goes on. Then, of course, the air travels from the opposite direction, the stove being operated naturally on gas and air, one stove being heated by air and the others are being heated by burning the gasses in the furnace.

The air after passing through the stove, being heated through the bustle pipe of the furnace makes it possible to maintain the temperature that gives us the large production of the modern furnace.

The interesting thing about this is that you will note that before the ore has dropped very much in the furnace that the large majority of oxygen has been removed and by the time it's a third way down it is almost in a stage of spongy iron, then from that point on it absorbs carbon. Slag, of course, accumulates more rapidly, being bulkier than the iron and, therefore, must be drawn out more frequently than the iron is. The iron is tapped four or five times in twenty-four hours whereas the slag is tapped about twice as many times.

Because there are several blast furnaces in a plant it requires some means of providing a fairly constant analysis of iron therefore we have the mixer through which the product of the furnace is poured. Its main purpose is to provide a reservoir because of course, the iron is consumed only as the furnace is charged and one charge of the blast furnace is altogether too much to take up in an open hearth, or the Bessemer open hearth.

The mixer is tipped and the metal is poured into the ladle, that ladle in turn is transferred into the converter and then the charging of the converter into the ladle. This process is uni-



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by Wallace G. Imhoff

THIS book covers pickling room practice, and construction and maintenance of pickling equipment. Written in a manner that will appeal to practical picklers in the sheet, tin plate, strip, pipe, wire, seamless tube, enameling, foundry, hollow ware, galvanizing and lead-coating industries. The author, Wallace G. Imhoff, for 5 years was industrial fellow, investigating pickling and galvanizing at Mellon Institute of Industrial Research, University of Pittsburgh.

Scope of the work may be inferred from chapter headings which include: Facts About the Steel and Iron Base and Iron Oxides and Scale; Acids, Bath Temperature and Pickling Time; Steam, Air and Agitation; Solutions, Tanks and Contaminations; Equipment and Production Principles; Compounds and Inhibitors; Fumes, Ventilation and By-Products; Chemistry of Pickling; De-Fumes, Ventilation and By-Products; Chemistry of Pickling; Departments; Pickling Steel and Copper for Tinning; and, Pickling for Zinc and Lead-Coated Sheets.

Based on practical experience obtained in plant pickling departments, and information compiled interviewing practical picklers, foremen, superintendents, managers and others. Intended for the man in the plant. In addition to 46 illustrations, a detailed list of contents and a cross index of over 575 items, the text includes a 35-page bibliography of pickling articles and books.

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que in itself in that no fuel is required, the air being blown through the bottom of the converter and uniting with the materials desiring to be removed provide sufficient heat through oxydization. At the same time the blast furnace is transferred to an open hearth furnace where scrap is added.

This slide shows the violence of the boil while the steel is being brought to the proper analysis. The next cross section shows the flow of gases through the open hearth, the hot gases passing down one side to the checker system heating it up and the air in turn is brought in through the other side.

Of course, when producer gas is used it is necesary to preheat that, as is shown, but fuel such as natural gas, coke, oven gas, oil and tar cannot be preheated. In that case both of the checker systems on the left are used for air.

The ingot is the raw material for the rolling mills. After the ingot has been poured the mold is slipped off. Now at that point because of the unevenness of temperature the inside being hotter than the outside, it is necessary to make the temperature throughout the ingot uniform. Therefore, it's put in the soaking pit and is therefore brought to an even temperature. Here you recognize the charging end of the billeting furnace and so on to the sanitary side of the steel mill. Conditions have been very much improved in recent years and it is constantly under the supervision of men whose sole duty is to take care of the safety end of the mill.

I wish time would permit to go into the educational work conducted especially for the men, as it is my particular interest but it would take too long. However, many different types of educational work are conducted, from the training of apprentices to the foremen and salesmen training work.

The youngsters certainly get a great kick out of the annual picnics and Christmas parties held for the employees. They're both very largely attended.

On this fourth reel we have various departments of the wire mill shown and I am sure you will be interested in that. You will notice from the number of times that sanitary picture appeared that our men keep clean. (Laughter).

Well, that's the end of the reel.

CHAIRMAN BROWN: Are there any question you gentlemen would like to ask Mr. Kempton about the picture? Any of these discussions are open to question. You can ask any questions about the papers that are read. If the speakers can answer them they will and if they can't they'll probably tell you where to go. (Laughter).

Beside the film on steel there was presented a film that referred to Monel metal.

CHAIRMAN BROWN: The next speaker and the final paper in the meeting is in connection with the film "Monel Metal and Its Uses". The film takes you through the making of the metal, the fabrication of the

wire and the weaving. The speaker will be Mr. C. D. Grover of the Whitehead Metal Products Co. of Buffalo, N. Y. Mr. Grover.

MR. C. D. GROVER, White head Metal Products Co., of Buffalo, N. Y.: Let me say a couple of words about Monel metal. Compared with 5 or 10 years ago it is relatively well known. However, I can't help but feel that a lot of you don't know what it is. It is not a steel. It is an alloy of nickel and copper with two parts nickel and one part copper and a certain percentage or two of impurities which can't be avoided. It is not new. Monel metal has been produced for 25 years up until the end of the war practically all of the products were used by the United States Navy for corrosion resisting parts in torpedo work, etc. During the past 8 or 10 years, they have been endeavoring to introduce it in the industry.

Probably the first thing you think about is that it is an expensive article. The physical properties are less well known and there are applications where the physical properties are the reason for monel metal being used. The tensile strength of monel metal is relatively high comparing it with materials other than special alloy steels. The tensile strength runs from 70,000 to 75,000 lbs. The spring runs about 150,000 lbs. The ductility is very high. That is very necessary. The elasticity of monel metal is 25,000,000. That is only exceeded by stainless steel and other stainless steels.

The modulus of pure, nickel which is its first cousin, is 30,000,000 which is on a par with alloy steels and with plain steel. The impact resistance of monel metal is very high. The fatigue limit of monel metal is also high, running from 35,000 to 50,000 depending upon the temperature—or rather, upon the temper.

At the present time engineers and designers of equipment are looking more and more to the fatigue limit as determining the ultimate stress that should be placed upon a par. In common with nickels and alloys containing nickel, the physical properties are retained at relatively high temperatures which means as the temperature goes up, your loss in strength or fatigue quality is retained to a relatively high degree that makes monel metal available for medium high temperature service.

It is not advisable for high temperatures alone. At the present time the engineer and the research man are looking very closely at corrosion fatigue limit because when a piece of metal is placed on stress at the same time it's in a corrosive media. The effect is much greater than either one alone. That phenomena has been known for a long time under the name of "season cracking". The two of them together constitute a severe menace in that particular field because of its high cor-

(*Please turn to page 330*)

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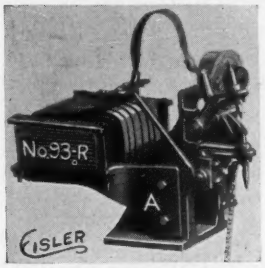

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Galvanizing Prevents Decomposition

(*Continued from page 309*)

wire through acid and then put it directly into the expeltor. Do you know of any disadvantage other than a greater formation of dross?

MR. SPOWERS: What kind of flux were they using?

MR. LEWIS: No flux. They were using hydrochloride to clean the wire and there was nothing between the cleaning and the spelter.

MR. SPOWERS: That's the old way of doing it. You won't get as efficient a coating as when you use the method you outlined to us.

Additional Personals

Willis D. Glendening has been transferred from Fort Wayne, Ind., to a new coil winding factory of the Canadian Wire & Cable Co., Toronto, Canada, which is associated with the Dudlow Mfg. Co., Fort Wayne.

—

George D. Frost has been appointed manager of the New York office of the Brainard Steel Co., Warren, O., producer of electro-galvanized strip steel, cold-rolled strip steel, patent barrel hoops, etc.

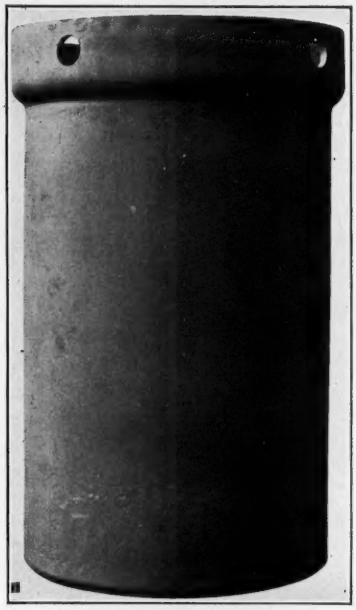
—

G. F. Blackmer, general superintendent and **J. A. Coakley,** general traffic manager, American Steel & Wire Co., were recently appointed vice presidents, continuing their respective capacities at Cleveland. **B. H. Lawrence,** formerly mechanical engineer at Cleveland, was promoted to be chief engineer there. **Frank Baackes,** vice president at Chicago, has been made assistant to the president.

—

J. E. Conroy, formerly with the Standard Horseshoe Co., has been made general manager of sales for the Tremont Nail Co., Wareham, Mass., under direction of J. S. Kenyon, Providence, R. I., president of the company, which has continuously manufactured cut nails for more than a century.

Standard Forge Fire-Hammer Welded ANNEALING POT



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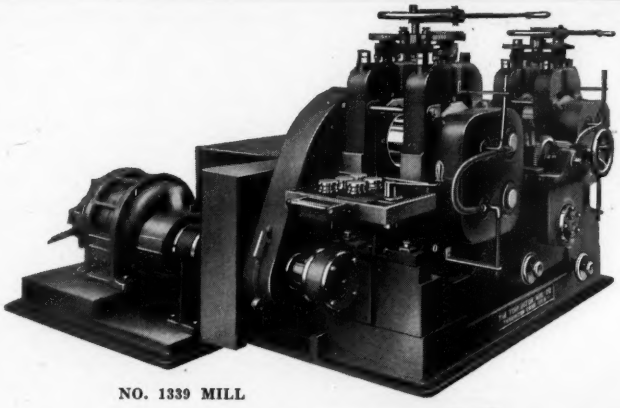

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Torrington - Conn, U.S.A.
44 Franklin St.

The World's Wire Practice

(*Continued from page 307*)

There are certain practices which are generally regarded here as fundamental necessities for wire preparation.

1. The bundles of rod or wire must be well opened up so that they will hang loosely on the yoke and give free access to the acid as well as to the sulling water, to the lime and to the hot air in the baker.

2. To stand a large number of drafts, the rods must have at least a moderate sull coat.

3. For the same purpose, there must be a heavy lime coat.

4. The stock must have quick, sharp baking at 300 deg. Fahrenheit or over.

Let us now take a look at four European wire mills that have made the difficult shift from wet to dry drawing and are producing satisfactory wire on high speed continuous machines.

Plant 1. Tightly banded bundles of wire rods just as received from the rod mill, are piled in a large crate holding 2 tons. This mass of tightly banded and closely packed rods, is pickled, sulled, lime coated and baked in the crate and is never loosened up until it gets to the wire machine. Probably what saves it is the agitation of the acid by low pressure air from a blower. This practice is not uncommon in Europe and has been successfully adopted by several American plants. The dies in this mill are of steel, hammered and punched.

Plant 2. Tightly banded rods are cleaned in this plant in exactly 5 min. Although this stock is expected to go down to 22 gauge without annealing and in fact to go direct to 18 gauge from the rod on one machine, it is given absolutely no sull coat. During the first few months the rods were sulled but during an unusually cold spell the sprinkling water frone on the rods, and as an experiment the manager tried cutting out the sprinkling altogether. He was so pleased with the result that he never took it up again. These rods get a heavy lime coat but

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.125", .160", .180", .1875", .200", .225", .250", .275", .300", .3125", .320", .350", .357", .375", .400", .417", .425", .4375", .488", .500", .529", .576", .625", .684", .750", .875", 1.000", 1.125", 1.250", 1.375", 1.500".

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OUR WIRE MACHINERY CATALOGUE SENT ON REQUEST

they are baked in a steam-heated baker. There is a rapid circulation in this baker of air which has been heated by passing through steam coils. It cannot possibly be over 230 deg. Fahrenheit and is probably considerably lower. The dies at this plant are reamed dies made from tempered steel and 10-330 lb. bundles are expected per hole.

Plant 3. Here the rods are pickled in the usual way but they are sulled for one hour, in spite of the fact that 3 min. produces a satisfactory sull coat. The rods are dipped into what is nominally a lime bath but it is a 600-gal. vat containing 60-lb. of lime all of which appears to be in solution. It is nothing but green water and no trace of lime can be found on the rods either before or after baking. Hammered and punched dies are used in this plant and they have practically no bearing. Any attempt to increase the bearing length pulls off the coating from the wire. The soap here is unusually rich in fat.

Plant 4. Cleaning and coating practice at this plant is perfectly normal but there is absolutely no baking. A small experimental baker was built and tried but it was decided that the unbaked rods went better. Hammered and punched steel dies are used here but tungsten carbide dies are gradually creeping in.

The question will naturally arise; How are these European mills going to make out in the way of production with American practice and continuous machines? The answer is that they are already doing remarkably well. A theory quite widely held here, particularly among democratic congressmen, is that the poorly paid labor of Europe is naturally inefficient and that this natural inefficiency is our protection against competition. This is absolutely wrong. The fact that a European laborer is willing to work for poor pay has made it seem cheaper to his employer to cramp his efficiency by withholding from him expensive labor-saving devices. This situation is changing. Euro-

pean labor is not going to remain poorly paid. The 8-hour day is much more firmly established in Europe than in America and since the stabilization of currency in various countries, real wages have been gradually mounting. European manufacturers are shrewd, far-seeing people and they are going to get the jump on the situation by supplying labor-saving devices before they are beggared by advancing labor rates. I find this situation pretty general throughout Europe. European manufacturers foresee a gradual swing towards American labor conditions and since they expect to be faced with American problems they are getting all set to apply American remedies and they are not going to wait too long before they start.

As for actual output per man-hour in European mills with American practice and American machines, figures have been given me in confidence which I cannot publish, but turn back to a preceding paragraph, note figures given as American practice with continuous machines, and accept my assurance that these figures are being beaten in plants whose previous practice was one-fourth to one-seventh these amounts.

There is in these figures a lesson and a warning, on which I will not presume to do more than point out that the mills in question competed actively for business along our coast line on their previous costs. Our European competitors are keen, energetic, and far-seeing men. They have grasped, I believe to a fuller extent than our own manufacturers, the fact that the mere installation of continuous machines is only the first step in taking advantage of their potentialities. They have scrapped everything, started fresh, and arranged their plants to take advantage of every handling development made possible by 100% continuous drawing. They state frankly that they have not yet fully realized the savings that they can clearly foresee.

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Silver Plated Copper Lahn

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CRIMP AND STRAIGHT

Brass	Nickel Silver
Steel	Phosphor Bronze

Copper

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Successors Royle & Akin

Fine Wire Manufacturers

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DISCUSSION

CHAIRMAN BROWN: Mr. Kenneth B. Lewis, of the Morgan Construction Company blew into my office about the middle of April and told me he had been over in Europe studying their conditions in the various mills. You will be interested, I'm sure, in what Mr. Lewis has to tell you. Mr. Lewis.

MR. KENNETH B. LEWIS, Morgan Construction Company, Worcester, Massachusetts: I see a lot of you had the fare to pay to come to Buffalo. If I knew enough about this subject to instruct you people I doubt whether I would tell you. You would have to come to my office and pay the consulting fee.

There is one subject, however, about which I probably know a good deal more than the average wire man. I have had some unusual opportunities to see wire drawing carried on in a number of foreign countries. It is not easy to get into foreign wire mills and if you do get in you're not apt to see very much. However, I went into these mills on the urgent invitation of the mill owners and I was in a position to insist that they show me everything. I was very well treated over there. I am not going to disclose any secrets. They have their secrets—plenty of them. They don't let their own friends into the mills.

Mr. Lewis read his paper.

CHAIRMAN BROWN: Any questions? In asking questions please give your name and company.

MR. E. J. POOLE, (The Carpenter Steel Company, Reading, Pennsylvania): First I'd like to ask Mr. Lewis what kind of stone is used in England for acid tubs?

MR. LEWIS: I have seen a lot of granite. I have seen a lot of tanks hewed out of granite. I have seen sandstone and also equipment made out of slate slabs.

MR. POOLE: What do they use between the slate slabs?

MR. LEWIS: I think they

use sulphur.

MEMBER: Sulphur and silica sand.

MR. POOLE: Another thing I'd like to ask, Mr. Lewis, is what is the minimum weight of coil you would recommend to use on a continuous drawing machine? I'm talking now as a jobber of wire drawing rather than manufacturer as most of the men in this room are today. Large quantities I mean are things we don't touch. I'm talking really like a tool steel mill man.

MR. LEWIS: Starting from five rods I should say roughly that if you can't get at least 150 pound bundles with low-carbon wire you are likely to have hard sledding. There are exceptions but if I had to make a broad general statement, 150 pounds would be the minimum.

Discussion of Films

(*Continued from page 325*)

rosion resistance together with a high fatigue.

Monel metal is very valuable. The production of monel metal wire has been limited to relatively few companies. One of the reasons for that is that metal like monel metal is something special and has to be handled in a special manner which does not fit in altogether satisfactorily with the drawings of steel or copper wire. The wire drawing equipment is practically the same as is used in the steel industry. If any of you undertake the drawing, the two points which will cause you trouble and have to make a special provision for are the annealing and pickling. The annealing, 1,600 to 1,800 deg. at that temperature, will take on an oxydized coating which must be removed. Pickling solutions are of little or no effect on monel metal. This means that if you put a coil of annealed wire which doesn't have any dioxide into the usual pickling which you use in the steel industry, and let it stay for 4-6 months, you find that you haven't pickled economically. The annealing to be pickled economically must be without a scale. The annealing and the cooling must be done in an atmosphere free from oxygen. The pickling requires nitric acid in one form or another. Practically the only acid which will attack monel metal sufficiently to pickle it is nitric acid and that is not pleasant stuff to play with in the pickling shed and requires special equipment to handle. Those two make it highly specialized to produce monel metal. As far as monel metal interests you, from the standpoint of equipment you use in drawing steel, it is limited, of course, to pickling equipment and monel metal has been used for a good many years for chains, racks, crates, etc.

The corrosion of monel metal by the sulphuric acid used in cleaning steel is very low anyway and when the crate is immersed in sulphuric acid and with steel in the crate there is a protected galvanic action set up with the result that there are crates in service which have been in service for a long while with practically no corrosion. The resistance to impact and high strength and the availability of monel metal in rock form also contributed to its use as pickling equipment.

The uses of monel metal wire are not as varied as steel or copper, of course. The first thing you would think of would be springs, coil springs, Where temperatures are high or where there is a corrosive condition to be met, the use of monel metal springs is becoming more and more prevalent. The high fatigue limit and the high corrosion fatigue limit contribute to the application of monel metal in this form. The usual use of wire products for automatic screw machine work is increasing rapidly. Monel metal screws and bolts are being used where corrosion resistance and strength are required.

The electrical conductivity of monel metal is low. It is not used to carry an electrical current. Its oxidation is a little too great to warrant its use at high temperature, however, there are some cases where they would be used.

That is just a brief resume of monel metal, what it is, and what it's being used for. The film is not 100% talkie but gives you a clear picture of the production of monel metal. I believe you'll find it of general interest. All right with the film!

CHAIRMAN BROWN: Are there any questions? This concludes our first wire meeting and I hope that we will have many more of them. Thank you, gentlemen, for your cooperation in coming.

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VII. Effect of Cold Work on the Physical Properties of Metals (cont.)
VIII. The Effect of Heat Treatment After Cold Work
IX. Theories of Plastic Flow in Cold Worked Metals
X. The Pathological Aspect of Cold Working Operations
XI. The Application of Cold Work to Non-Ferrous Metals and Alloy Steels

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Wire and the Signal Corps

(*Continued from page 305*)

operated 20 hours a day and 30 days a month for 6 months they could strand not more than two-thirds of the field wire (11 strands) and four times the outpost wire (7 strands.) Moreover if this were done there would be no 12 bobbin and few 7 bobbin stranders available for other military or naval needs, commercial uses or reserves in the event that certain factories or areas became inoperative.

Second: The steel wire drawing appears to present a problem, but less severe than the stranding.

Third: There appears to be no problem as to the bronze wire drawing or the braiding except the time consumed in braiding.

Fourth: To meet this situation certain expedients might be resorted to, for example, lay up a reserve of stranded bare conductor; increase the number of stranders; substitute bunchers for stranders in copper wire facilities; stop all manufacture of wire which competes for the use of the stranders.

And so do you wonder that the Signal Corps is continually trying to find means to eliminate or relieve this production situation which might become acute? Do you wonder that we are remembering the lessons of the World War from which we learned much of the possible danger points? Further, do you wonder if we are taking advantage of the knowledge which industry has, and could, make available for us? Let us assure you that we are trying to uncover every possible piece of information that will assist in the slightest degree, provided only that it will produce a satisfactory wire.

Remembering that the Signal Corps wants the lightest, strongest, best insulated, flexible communication wire that will lie inert and that can be made quickly by mass production, let us propound a few questions for your consideration:

Can a suitable wire be bunched instead of stranded?

Must we continue to use high tensile steel or can we lighten the weight by the use of aluminum, an alloy, or welded combination?

Must we take the time to braid or can the rubber insulation be of such quality as not to require a protective braid?

Must we use Swedish steel rods or can we get tensile strength and quality by drawing basic open hearth steel to 300,000 lbs. per sq. in?

These are a few of the many questions that arise, some possible of solution, others not.

Army and Industry Must Cooperate

It is a mutual problem. The Army is seeking to disturb industry as little as possible in time of peace and to assure as small a disturbance as possible in the event of an emergency. Industry, is in the throes of commercial competition where dividends count and very distant orders even though they will produce the nerves of the nation's defense must necessarily take a position subordinate to current business. The assistance that has been given by industry and the way our questions have been given consideration by many of the manufacturers makes us feel assured that some day we will have a wire and have one so nearly commercial that it will answer our

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7. Carburizing. Carburizing Compounds and Processes
8. Carburizing. Equipment and Handling
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10. Fuels
11. Furnaces for Steel Treating. Stationary Hearth Furnaces
12. Bath Furnaces: Labor Saving Furnaces
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The following types of rope strand construction are included; 6 by 7, 6 by 19, 8 by 19, 6 by 37, 6 by 24, 6 by 12, 6 by 6 by 7 (6 by 42) tiller rope; 5 by 19 marline-clad rope; 1 by 7 stiff strands; seizing strands; sash and bell cord; and lead line with wire cord center. The specifications are appended notes on recommended practice for the storage, handling, use, inspection, and maintenance of wire ropes and notes on working loads and requirements of ship classification societies.

Review of Recent Patents

(*Continued from page 318*)

No. 1,763,873. TELEPHONE CABLE. Patented June 17, 1930, by William K. Weston, Sanderstead, England, assignor to Western Electric Co., Inc., of New York, N. Y., a Corporation of N. Y. This invention is concerned chiefly with a screen to provide sufficient strength to permit of satisfactory stranding and also provides adequate separation between the screen and the adjacent quads to reduce the capacity effect of the metal foil.

No. 1,764,618. STRAND-DISTRIBUTING APPARATUS. Patented June 17, 1930, by Clem H. Franks, La Grange, Ill., assignor to Western Electric Co., Inc., of New York, N. Y., a Corporation of N. Y. This invention covers a strand distributor for coil winding machines, the inventor employing magnetic rollers in his construction.

No. 1,765,047. DRAWING MACHINES. Patented June 17, 1930, by Albert C. Belles, New Brighton, Pa., assignor to Union Drawn Steel Co., Beaver Falls, Pa., a Corporation of Penna. The invention relates particularly to machines for the drawing of metallic rods, and the like. No draw chain is employed in the invention, and the drawing may be done in opposite directions.

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For more complete information, consult the annual Directory, Index & Buyers' Guide.

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Columbiana Boiler Co., Columbiana, O.

ANNEALING SALTS
European Color & Chemical Co., Weehawken, N. J.

ARMORING EQUIPMENT
Sleeper & Hartley, Inc., Worcester, Mass.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BRAIDER CARRIERS
Mossberg Pressed Steel Co., Attleboro, Mass.

DIES—Tungsten Carbide
Carboloy Co. Inc., New York, N. Y.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.

FLUXES—Soldering
Kester Solder Co., Chicago, Ill.

FURNACES—Wire Annealing
Vaughn Machinery Co., Cuyahoga Falls, O.

GALVANIZING ENGINEER
W. H. Spowers, Jr., New York, N. Y.

GALVANIZING—Hot
Wallace G. Imhoff Co., Vineland, N. J.

GALVANIZING LADLES, PANS, POTS
Columbiana Boiler Co., Columbiana, O.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller & Co., Homer, N. Y.
J. T. Robertson Co., Syracuse, N. Y.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CRANES
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

MACHINERY—Armoring (Cable, Wire Hose)
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New England Butt Co., Providence, R. I.
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Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.

MACHINERY—Bundling
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson.

MACHINERY—Cable, Electric
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Watson Machine Company, Paterson, N. J.

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Sleeper & Hartley, Inc., Worcester, Mass.

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Lewis Machine Co., Cleveland, O.
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Bellet Diamond Die Works, N .Y.
Cochaud Wire Die Co., New York.
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Globe Wire Die Corp., New York
Koebel Wagner Diamond Corp., Newark, N. J.
F. Krause & Co., Inc., Jersey City, N. J.
Master Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
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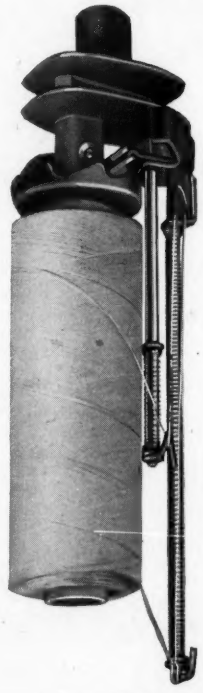

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Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Torrington Mfg. Co., Torrington, Conn.
W. E. Somerville & Co., Coal City, Ill.

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MACHINERY—Straightening
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Waterbury-Farrell Foundry Machine Co., Waterbury, Conn.

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Torrington Manufacturing Co., Torrington, Conn.
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Apco-Mossberg Co., Attleboro, Mass.
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REEL CRUTCHES
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SOAPS—Wire Drawing
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J. T. Robertson Co., Syracuse, N. Y.

SOLDER
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R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

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Vaughn Machinery Co., Cuyahoga Falls, O.

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WIRE—Various Kinds
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Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
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We thought the old machines were pretty good in the old days (and they were) but times have changed. Today we offer not a better method nor a new principle, but—a far better machine that meets in eloquent fashion every demand of the present day—

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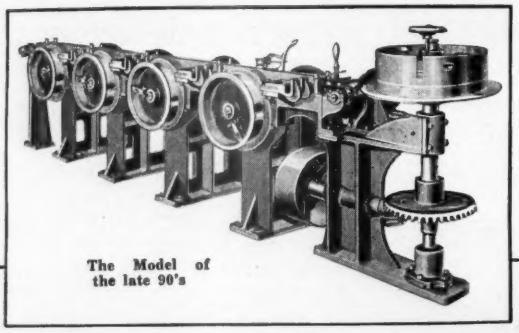

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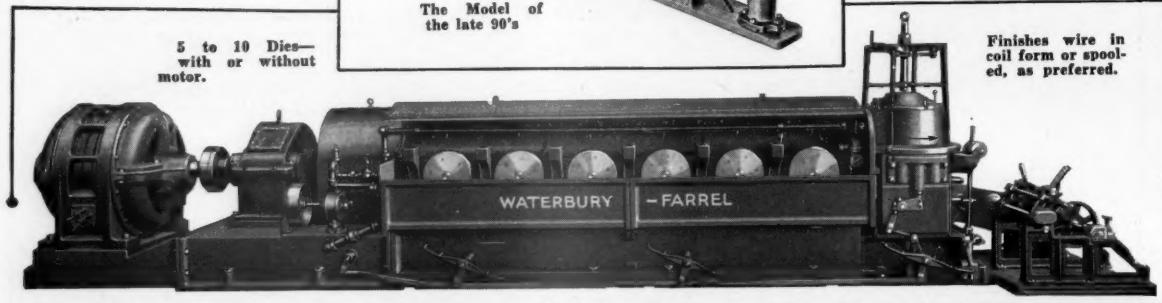
5 to 10 Dies—with or without motor.

Finishes wire in coil form or spooled, as preferred.



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	High Carbon	252
	Non Ferrous	53
Process Wire		284
Common Products		648
	Total	1370

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